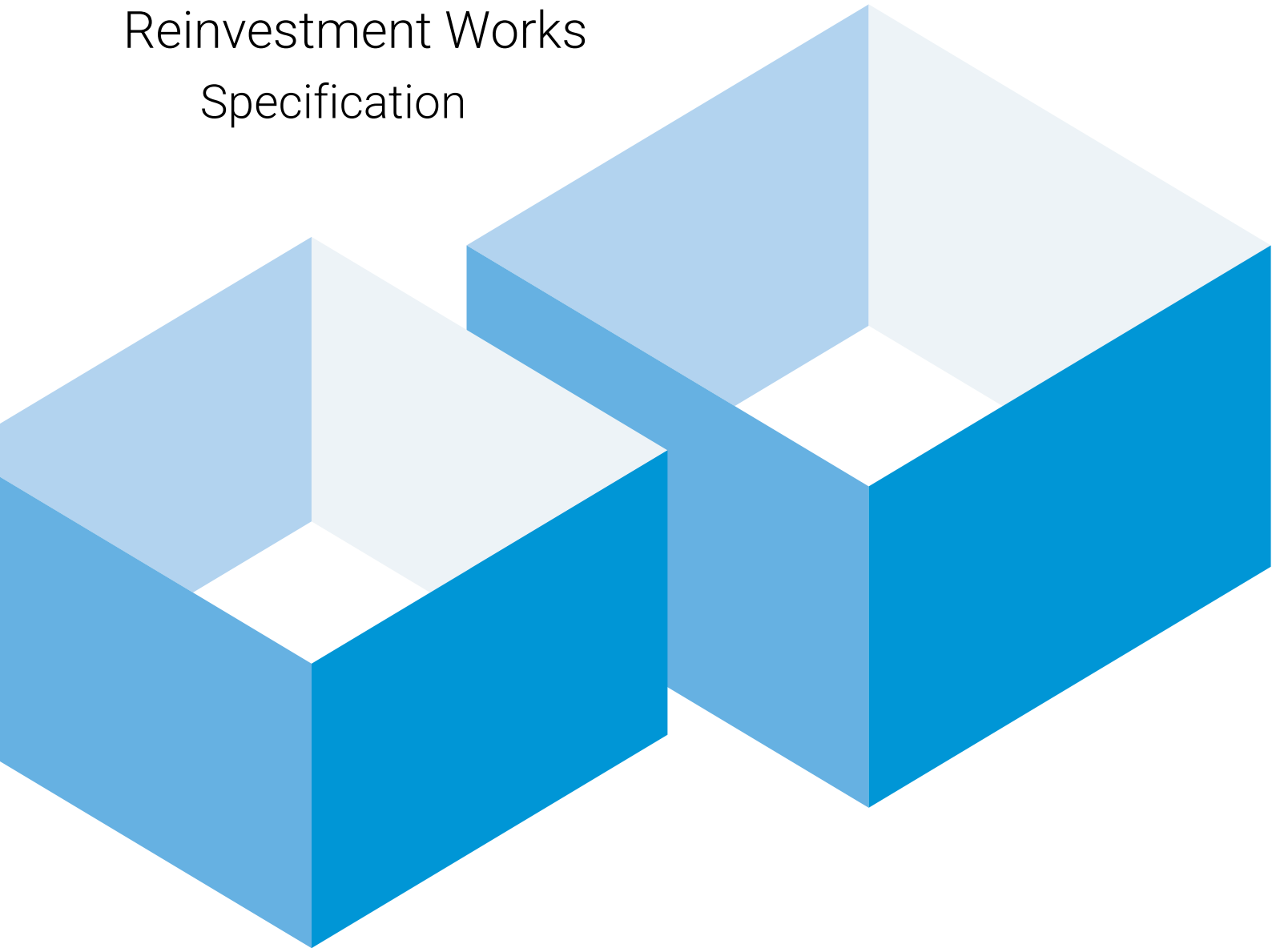
M3NHF Schedule of Rates

VERSION 8

Planned Maintenance and Property Reinvestment Works

Specification



Your challenges expertly solved in partnership

Published by M3 Housing Ltd, Three Kings, 23 Commonside East,
Mitcham, Surrey, CR4 2QA
www.m3h.co.uk

ISBN: 978-1-908409-03-4 | M3NHF Schedule: Planned Maintenance and Property Reinvestment Works

Version 8 revised and updated in 2023 by Rand Associates Consultancy Services Ltd.

Incorporating the NHF Form of Contract 2023 (Planned Works)
ISBN: 978-1-908409-38-6

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of M3 Housing Ltd.

© Rand Associates Consultancy Services Ltd

RAND ASSOCIATES EST 1975

Your challenges expertly solved in partnership

SPECIFICATION OF WORKMANSHIP AND MATERIALS

© Rand Associates Consultancy Services Ltd

CONTENTS

GENERAL 3
KITCHEN; ELECTRICAL WORKS 8
BATHROOM; ELECTRICAL WORKS 11
ELECTRICAL WORKS 14
ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) 28
ELECTRICAL INSTALLATION ASSOCIATED WITH ELECTRIC SPACE HEATING AND HOT WATER 39
SMOKE, HEAT AND CARBON MONOXIDE DETECTORS 52

© Rand Associates Consultancy Services Ltd

GENERAL

GENERAL

Applicability

001 This initial general section applies to all subsequent sections of this Specification of Workmanship and Materials **("this Specification")**.

002 This Specification is drafted as a series of instructions that the Provider must ensure are complied with in relation to the Works. Each instruction includes all tasks necessary to comply fully with the instruction and the Schedule of Rates item(s) to which it relates.

003 The Schedule of Rates amounts, as adjusted by the Provider's tendered Rates where applicable, and the tendered Prices include for carrying out all tasks required by this Specification. No further payment is due to the Provider in respect of any such tasks beyond the payments provided for in the Schedule of Rates, the Price Framework and the Price Schedule.

004 Specifications across several trades may be relevant to each Schedule of Rates item. The Provider must comply with all requirements of this Specification applicable to the specific type of Works to be undertaken.

005 References to Paragraphs and Sections in this Specification are to the applicable Paragraph and Section of this Specification. If any contradiction appears within the Specification sections, Schedules of Rates, the Client's Policy documents etc., the most rigorous standard takes precedence.

Standards of workmanship and Materials

006 Carry out and complete all Works as required by this Contract including:
- in accordance with Law including Health and Safety Law and Building Safety Law;
- in accordance with all applicable Codes of Practice;
- in accordance with Good Industry Practice;
- in accordance with the Client's Policies;
- in accordance with any specific requirements for those Works in this Specification; and
- to the satisfaction of the Client's Representative.

007 To the extent that the standard of any Works has not been specified in this Contract, agree the relevant standard for the Works with the Client's Representative before their execution. Where particular Works or working methods are to be "approved by" "agreed with" or are indicated to be "subject to the approval of" the Client's Representative, give the Client's Representative adequate notice when such approval or agreement is needed and retain evidence of all approvals given, and items that have been agreed, by the Client's Representative.

008 To the extent that it is necessary to Design any aspects of the Works, in preparing those use the reasonable skill, care, diligence and expedition as would be reasonably expected of a prudent experienced contractor with Design obligations having experience in carrying out projects similar in size, scope, nature, complexity and value to the Works.

009 Maintain all existing lines and levels at all times and carry through new Works to the same lines and levels unless otherwise Instructed by the Client's Representative.

European and British Standards & Codes of Practice

010 Ensure all Works undertaken and all Materials used in those Works comply with all applicable Standards and Codes of Practice that are current at the time of their use.

011 References in this Specification of Workmanship and Materials to any Standards and Codes of Practice are to be construed as references to the version current at the time the Order is undertaken.

© Rand Associates Consultancy Services Ltd

012 Where a specific Standard or a Code of Practice is referred to, this sets out the minimum acceptable standard of Materials or workmanship.

013 Any requirement in this Specification of Workmanship and Materials to use Materials defined by reference to a specified Quality Assurance Scheme, British Board of Agrément Certificate, Standard or other approval, may be satisfied by compliance with an equivalent international Standard.

014 A Provider offering any Materials on the basis of compliance with any such approval or international Standard shall notify the Client's Representative of such substitution in advance of placing any order for those Materials and provide (in English) technical or other details of the approval or Standard and its qualifying tests.

Materials

015 The Client wishes to standardise the use of Materials across its Properties. This is in order to simplify parts requirements and van stock loads, to improve its repairs processes and to reduce maintenance costs. Wherever possible, match all Materials used to materials currently used in the Properties, particularly in terms of their parts requirements and repair procedures. In this Specification the Client has set out details of its current Materials to which the Provider is required to standardise.

016 Where this Specification indicates that Materials are to be "Approved by the Client's Representative", provide samples of the proposed Materials to the Client's Representative for Approval. Any Materials that comply with the functionality and compatibility (including aesthetic compatibility) requirements of this Specification may be proposed. No further approval is required for any Materials listed in this Specification as being the Client's currently used Materials. The purpose of the Client's Representative's decision on the use and approval of such Materials is to ensure that they meet the Client's requirements for functionality and compatibility. The decision of the Client's Representative on this is final.

017 Where this Specification requires Materials to be matched to existing Materials or finishes, this match is subject to the Approval of the Client.

018 Do not use any Prohibited Materials in carrying out the Works. Prohibited Materials are those materials which are generally accepted or (having regard to Good Industry Practice) are reasonably suspected of:
- being harmful in themselves;
- being harmful when used in a particular situation or in combination with other Materials;
- becoming harmful with the passage of time; or
- being damaged by or causing damage to the structure in which they are to be affixed.

019 Materials are to be regarded as harmful if, in the context of their use in the Works (whether alone or in combination with other materials) they:
- are prejudicial to health and safety;
- may pose a threat to the structural stability or the physical integrity of any Property; or
- could materially reduce the normal life expectancy of any part of the Property.

020 Sustainable Timber: All timber and wood derived products referred to throughout this document and which are supplied to the Client, or used in the Works, must be procured in accordance with all applicable Law.

021 CE/UKCA Marked Products: All products referred to throughout this document and supplied to the Client, or used in the Works, must be supplied with a Declaration of Performance (DoP) and carry the appropriate CE/UKCA conformity assessment marking.

Performance Standards on the CE/UKCA mark must comply with relevant Building Regulations where required.

The CE/UKCA mark must be fixed visibly, legibly and indelibly either to the product or to a label attached to the product. If this is not possible or not warranted, then it must be fixed to the packaging or within the accompanying documentation.

The DoP must be made available by the manufacturer (this may be via a website).

022 Use, fix and apply all Materials strictly in accordance with the manufacturer's recommendations, directions, instructions or technical data sheets.

© Rand Associates Consultancy Services Ltd

023 Participate in joint initiatives with the Client and other contractors to establish supply chain agreements.

024 Where appropriate suggest (economically viable) amendments to this Specification where those amendments may lead to an improvement in environmental performance or sustainability.

025 At the Client's request provide all information the Client reasonably requests regarding the environmental impact of the supply and use of any Materials the Provider selects for use in the Works.

026 ~~**[optional clause]** If the Provider considers that decanting elderly, vulnerable, people with disabilities and other occupiers and carers from a Property whilst intrusive Works are undertaken or whilst the Works disrupt washing and/or sanitary facilities, provide (at no extra cost) the following facilities:~~

~~**Decant Mobile – Daytime Decant**~~

~~Temporary Accommodation conforming to all applicable Standards.~~

~~Daytime facilities (where agreed before the start of the Works in the form of either a touring caravan used outside homes between 9am and 5pm and then removed, or a mobile unit located in a fixed position supplied with at least the following:~~

- ~~External door;~~
- ~~Bedroom;~~
- ~~A toilet compartment with WC suite, wash handbasin and shower unit;~~
- ~~A flued gas fire/electric heater (note: gas is the preferred option);~~
- ~~A flued gas fire multi point water heater or electric water heater;~~
- ~~Electrical installation complying with the IET Wiring Regulations;~~
- ~~Mattresses with fireproof removable covers (which shall be thoroughly cleaned and changed after each decant);~~
- ~~A cooking appliance and fridge;~~
- ~~Warning notice for health and safety advice to users;~~
- ~~Fire blanket (to be located by the cooking appliance);~~
- ~~1kg-powder fire extinguisher (to be located by the main door);~~
- ~~Smoke Detector;~~
- ~~Carbon Monoxide Detector; and~~
- ~~User's handbook (to be used by Provider when demonstrating the mobile to new occupants).~~

~~Also supply the following:~~

- ~~A security cabinet for 2 (two) 13kg (thirteen kilogramme) bottles of propane gas if gas is to be used (red gas bottle);~~
- ~~Entrance steps, handrails, level access ramp (maximum gradient 1:12) to be provided for people with a disability to the satisfaction of the Client's Representative;~~
- ~~Water supply; and~~
- ~~Mains sewerage connection (where feasible).~~

~~Daytime decanting must be as agreed with the Customer and the Client including as to the hours required for the daytime facility, its location and siting. The siting of decant facilities must not inconvenience car parking and/or access to adjoining dwellings.~~

~~Laundry and storage facilities, telephone connections [or] television aerials [or a dedicated car parking facility] are not required in a daytime facility *[Client to edit].*~~

~~A chemical toilet compliant with all Standards for portable chemical closets may be used where no sewer connection is feasible.~~

~~Ensure that all Temporary Accommodation, including its location, installation and checking, complies with Health and Safety Law.~~

~~Comply with any Code of Practice for the transportation, siting and commissioning of caravans published by the National Caravan Council.~~

~~Agree location of the day time mobile decant facility with the Client's Representative.~~

© Rand Associates Consultancy Services Ltd

~~Service checks are to be carried out by suitably qualified personnel after each decant. These checks should cover:~~

- ~~Electrical;~~
- ~~Gas;~~
- ~~Water;~~
- ~~Fire prevention equipment;~~
- ~~Warning Notices; and~~
- ~~Steps and Handrails.~~

~~**The facility is to be cleaned between each change of user**~~.

~~The following notice not less than 200mm x 130mm with the heading printed in red is to be fixed in a prominent position in the Temporary Mobile Accommodation.~~

~~**ADVICE TO OCCUPIERS**~~
~~Ventilation~~
~~Do not obstruct the ventilators, which are fitted; your safety depends on them.~~

~~In Case of Fire~~
~~Get everyone out.~~
~~Turn off the outside gas valve~~
~~Raise the alarm and call the Fire Brigade~~
~~Do not stay behind to put the fire out yourself~~
~~Do not put yourself at risk~~

~~Fire Precautions~~
~~Children – must not be left alone in the caravan.~~
~~When cooking never leave a cooker unattended~~
~~Do not use multi-adaptors.~~
~~If you smoke use metal or glass ashtrays not plastic.~~
~~Make sure cigarettes are put out properly~~
~~Do not smoke in bed.~~

~~Means of Escape~~
~~Make sure you know the location and operation of the emergency windows and doors,~~
~~Keep door and window keys handy.~~
~~Keep all escape routes clear.~~
~~If there is smoke, keep low where the air is clearer~~
~~Do not go back into the caravan.~~

~~Combustible Materials~~
~~Keep them clear of all heating and cooking appliances.~~

~~Fire Fighting Equipment~~
~~In addition to the 1kg powder fire extinguisher by the main exit door, a fire blanket is provided next to the cooker. Make yourself familiar with the instructions on your fire extinguisher and fire blanket and the fire precautions arrangements on site. Do not stay behind to put the fire out yourself. Do not put yourself at risk.~~

~~**The use of chip pans in mobiles is strictly prohibited.**~~

Permit to Work Certification

027 Comply with any "permit to work system" notified to the Provider by the Client's Representative and ensure that no Worker undertakes any Works covered by any "permit to work System" without a permit having been issued by the Client's Representative.

© Rand Associates Consultancy Services Ltd

Access

028 Ensure that a risk assessment is undertaken and a method statement is provided to the Client's Representative detailing the means of access to undertake all Works requiring access at heights including for inspection and testing.

Firestopping

029 Ensure that all holes for cables, pipes etc., in the structure of any Property formed or drilled by the Provider are fire-stopped in accordance with Building Safety Law.

030 Report immediately to the Client's Representative where existing holes for cables, pipes or service media in the structure of any Property have no or inadequate firestopping, giving the detailed location of the hole and providing digital photographs.

© Rand Associates Consultancy Services Ltd

KITCHEN; ELECTRICAL WORKS

102 All electrical work must be carried out to the applicable Standards for electrical installations, other applicable Standards Institution Publications and Statutory Regulations. **All cabling to be concealed and NOT surface run, unless otherwise specified or approved.** Cable shall be installed without joints other than at equipment and terminal fittings, Junction boxes and 30A connection plates are not permitted

103 All relevant Works to comply with Building Regulation's; Provider must be suitably accredited, and Works must be certified, and certificates electronically loaded onto the Client's Asset Management IT System.

Electrical Inspection and Test

104 As part of the undertaking of the Survey and Consultation on Customers Choice, prior to undertaking any Works, carry out a full inspection on the electrical installation within the Property and provide a written report in the form of an Electrical Installation Condition Report. On completion of any alterations or Works described below provide "Minor Electrical Installation Works or Electrical Installation Certificate to the applicable Standards for electrical installations as applicable.

Electrical Switch and Socket

105 Within appliance location below worktop provide and install single socket outlet and extend wiring above worktop and connect to a 20A DP switch with neon light.

Electrical Socket Outlet

106 Provide and install double switched socket outlets above worktop in location indicated on the standard drawings (restricted areas provided within the Client's standard details should be observed). Include for wiring to most convenient location in suitably sized cable.

Spurs (Label)

107 Engrave/label all existing and new 20A DP switches identifying their function.

Equipotential bonding

108 Standard to applicable Standards for electrical installations: Connect the following metallic parts to the main earthing terminal, where they are extraneous-conductive parts to:

- metal water installation pipes;
  - metal gas installation pipes, as near practical to the point of entry of the service into the Property and before any branch pipework where the meter is fitted externally. Where practicable the connection shall be made within 600mm of the meter outlet union where the meter is installed internally;
- central heating system pipework;
- other installation pipework (including oil and gas supply pipes) and ducting; and
- exposed metallic structural parts of the Property.

109 Sizes of bonding conductors are given in applicable Standards for electrical installations.

Supplementary equipotential bonding

110 Standard to applicable Standards for electrical installations: Within the zone formed by the main equipotential bonding, provide connections to:

- baths;
- sinks;
- exposed pipes; and
- heating systems.

111 In locations containing a bath or shower, supplementary equipotential bonding is comply with applicable Standards for electrical installations.

112 Sizes of supplementary equipotential bonding conductors are given in applicable Standards for electrical installations.

© Rand Associates Consultancy Services Ltd

113 Standard: Electrical equipment and/or electrical circuits installed in a room containing a bath or shower shall have RCD protection, complying with applicable Standards for electrical installations

114 Standard: Where all electrical requirements in the Property to applicable Standards for electrical installations are met, supplementary equipotential bonding as Clause 097 may be omitted.

Switch face plates

115 Where retained replace all existing switch face plates with new.

116 All switch and socket fittings shall be manufactured using white moulded plastic and shall from the one manufacturer

117 Typical scope of electrical works in individual kitchens:

- wall mounted light switches to suit kitchen layout.
- 3 no 13A twin switched socket outlets kitchen
- 1 no 13A twin switched socket outlet dining area
- A 20A DP switch with neon indicators (fridge, washing-machine, dishwasher, tumble dryer where applicable and cooker hood (fused at 3A) with 1 no 13A single un-switched socket outlet for fridge and 2 no fused connection (3A) for washing machine and tumble dryer below worktop, and 1 no fused connection unit (3A) adjacent cooker hood at high level.
- 2 no (max) ceiling rose and pendant drop with standard BC lamp holder to applicable Standard with 20 Watt BC compact fluorescent lamp with integrated control gear to have a total output greater than 400 lamp lumens
- 1 no heat detector;
- 1 no wall mounted canopy type cooker extractor hood at a minimum of 760mm above the hob with flat plastic ducting system along the top of the kitchen wall units direct to atmosphere, where feasible. Cooker extractor hood to comply with Waste Electrical and Electronic Equipment (WEEE) European Directive EC/2002/96, and Kite mark certified. Size: 60cm, colour: white or brown. Minimum extract rate of 30 l/s (108m³h) over the hob. Cooker hood to have 1 or 2 No. built in lamps to illuminate the hob below, three speed fan motor control to be located on the front face of the hood, washable grease filter, electrical supply: 230–240V/ 1/ 50Hz.
- Where a cooker hood exhaust cannot be ducted to atmosphere provide a recirculating cooker hood with charcoal filter and minimum extract rate of 30 l/s (108m³h) over the hob, and a wall mounted or ceiling mounted extract fan where feasible;
- 1 no 45A DP switch with neon indicator for cooker with a cooker connection unit below work top (where an occupier owns a separate hob and cooker, provide a separate 45A DP switch and cooker connection unit below worktop for each appliance);
- 1 no heating boost switch to applicable Standards for electrical installations, push button with control settings to replace standard water immersion heater switch;
- Earth bonding to sink and all necessary supplementary bonding;
- Where no existing alarm systems exists or alarms are only battery operated, provide a hard wired smoke detector system with an optical detector head to each of the circulation spaces and the main habitable room, and a head detector head in the kitchen.

Builders Works

118 Include for all builders works in installing new electrical fittings. Builders works to include chasing, re-plastering, cutting out plasterboard and making good and everything necessary in order that all new wiring is concealed and NOT surface run.

119 **Note:** All Electrical cabling is to be concealed and adequately protected and is not to be surface run.

Light Fitting

120 Carefully remove existing light fitting and remove off site. Provide and install 2 no (maximum) ceiling roses with a standard BC lamp holder having a 20 Watt BC compact fluorescent lamp with integrated control gear and to have a total output greater than 400 lamp lumens.

© Rand Associates Consultancy Services Ltd

Extract Fans

121 Provide and install a wall mounted canopy type extractor hood at a minimum of 760mm above the hob with a flat plastic ducting system along the top of the kitchen wall units direct to atmosphere, where feasible. Include for all accessories include a terminal grill etc. Include for all builders work in installing the new fan and all electrical connections and alterations as necessary to install the new extract fans.

Heat Detectors

122 Provide and install heat detector to ceiling. Include for all connections and alteration as necessary as Clause 98.

Smoke Detectors

123 Provide and install an optical smoke detector to in each of the circulation space and the main habitable room, where applicable as Clause 98.

Customer's appliances/fittings

136 Prior to commencement, the Provider is to obtain the Customer's signature to a Disclaimer Agreement in respect of any appliances located in the kitchen. Any refusal to do so must be brought to the attention of the Client's Representative and the work placed on hold, until resolved.

137 The Provider is to check the condition and working order of all such appliances and undertake a photographic record, paying particular attention to any existing scratches, dents or other damage.

138 Temporarily reposition fridge/freezer to facilitate the Works and ensure it is plugged into the electrical supply.

139 Customers are responsible for taking down and storing any personal fixtures and fittings e.g. knife racks etc and for emptying all existing cupbards. The Provider may be required to provide storage boxes for the use of Customers.

140 During the works the sink and a cooking facility should be left operational at the end of each working day.

141 The Provider is to re-install washing machine and dish washer and connect up hot and cold water feeds and wastes.

142 The Provider is to re-install and wire up any electric cooker to new control panel or cooker connection unit.

Client's current manufacturers/suppliers/products

174 Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand name	Manufacturer's details
Please refer to table within ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) section.		

© Rand Associates Consultancy Services Ltd

BATHROOM; ELECTRICAL WORKS

084 All electrical work must be carried out to the current applicable Standards and Statutory Regulations. **All cabling to be concealed and NOT surface run, unless otherwise specified or approved.**

085 All relevant works to comply with Building Regulation's; the Provider must be suitably accredited, and works must be certified, and certificates electronically loaded onto the Clients Asset Management IT System.

Luminaires

086 In the bathroom of each dwelling the Provider shall supply and install an enclosed light fitting with white body finish complete with one 28W 2D lamp high frequency gear and clear prismatic diffuser IP65 rated.

Bathroom ventilation

087 Any existing bathroom extract fan shall be disconnected and removed.

088 All bathrooms shall be provided with a new extract ventilation fan. The fans shall be fitted with integral automatic back-draught shutters.

089 The fan shall be set for and extract rate of 15 litres/second.

090 Attention is drawn to the fact that the operation of the light-switch in an internal bathroom with no windows shall control the fan and such fans to have a 15 minute timer overrun. In bathrooms with windows the fan shall be controlled by a 15A DP switch with neon indicator or flag ceiling mounted

091 All new fans installed to discharge through walls shall be fitted with a wall liner and external grille. Where the unit is ceiling mounted the extract shall be ducted through the roof space with a pre-insulated duct and condensate pipe.

Immersion heaters and thermostats

092 All existing cylinder immersion heaters shall be checked for operation and fitted with the correct length, new rod combined thermostat and resettable safety cut-out to meet the requirements of the appliacable applicable Standards.

Equipotential bonding

093 Installation in accordance with applicable Standard: Connect the following metallic parts to the main earthing terminal, where they are extraneous-conductive parts to:

- metal water installation pipes;
- metal gas installation pipes, as near practical to the point of entry of the service into the premises and before any branch pipework where the meter is fitted externally. Where practicable the connection shall be made within 600mm of the meter outlet union where the meter is installed internally;
- central heating system pipework;
- other installation pipework (including oil and gas supply pipes) and ducting; and
- exposed metallic structural parts of the building.

094 Sizes of bonding conductors are as given in the applicable Standard.

Supplementary equipotential bonding

095 Installation in accordance with applicable Standard: Within the zone formed by the main equipotential bonding, provide connections to:

- baths;
- sinks;
- exposed pipes; and
- heating systems.

© Rand Associates Consultancy Services Ltd

096 In locations containing a bath or shower, supplementary equipotential bonding is to comply with the applicable Standard

097 Sizes of supplementary equipotential bonding conductors are as given in the applicable Standard.

098 Electrical equipment and/or electrical circuits installed in a room containing a bath or shower shall have RCD protection, complying with the applicable Standard.

099 Where all electrical requirements in the dwelling to applicable Standard are met, supplementary equipotential bonding as Clause 092 may be omitted.

100 All Works in connection with the requirement above to be carried out in full compliance with both applicable Standard and the requirements of the local supply authority. It is the responsibility of the Contractor to establish the type of earthing system present at the site and include for all supply authority requirements.

101 All conductors bonded to pipes to be fixed using clamps with warning notices to applicable Standard requirements.

102 All electrical Work must be certified to Britsih Standard on completion, including all wiring, fittings and making good etc., and relevant electrical installation or minor electrical installation works certificate shall be issued on completion.

Electrical Inspection and Test

103 As part of the undertaking of the survey and consultation on Customer choice, prior to undertaking any Works, carry out a full inspection on the electrical installation within the Property and provide a written report in the form of an Electrical Installation Condition Report. On completion of any alterations or Works provide "Minor Electrical Installation Works or Electrical Installation Certificate to the applicable Standard as applicable.

Spurs (Label)

104 Engrave/label all existing and new switched or fixed fused spurs identifying their function.

Switch face plates

105 Where retained, replace all existing switch face plates and pull cord switches with new.

106 All switch and socket fittings to be from one manufacturer.

107 Where none exists, supply and install a mains operated optical smoke detector in each of the circulations spaces and main habitable room with a mains operated heat detector in the kitchen
(Not Applicable if Kitchen also being renewed in same Property)

Builders Works

108 Include for all builders works in installing new electrical fittings. Builders works to include chasing, re-plastering, cutting out plasterboard and making good, and everything necessary in order that all new wiring is concealed and NOT surface run.

127 Supply and install new 8.7KW or 9.5KW (as specified by Client) electric shower unit to applicable Standard, BEAB, BEAB CARE, RNIB, CE marked and WRAS approved complete with installation set maximum temperature control, phased shut down, low pressure indicator, installation set timer setting, fixed sliding rail, twist and lock shower head mechanism, shower hose with adjustable shower head outlet and soap dish , including plugging walls as necessary, connect to water and electrical supplies including provision of shower circuit including mini-trunking or rigid PVC-u conduit chased to walls etc., incorporating RCBO protection, controlled with 45A DP ceiling switch with neon light or indicator flag, all adjustments to pipework, adjust electrical supply as necessary, fill, test, and undertake tests, provide certificate, and remove all waste.

128 Supply and install new chromium plated thermostatic mechanical mixing shower valve to applicable Standard, BEAB CARE, TMV2 and WRAS approved complete with flow regulators, installation set maximum

© Rand Associates Consultancy Services Ltd

temperature control and fixed sliding rail, twist and lock shower head mechanism, shower hose with adjustable shower head outlet and soap dish including plugging walls as necessary, install service valves in an accessible position, extend hot and cold water supply pipework and fittings as necessary and connect to mixer, all builders work, fill test, and undertake tests and remove all waste.

129 The provision of a pumped waste if required will be reimbursed at the rates in the Schedule of Rates.

130 The provision of a pumped supply to the shower will be reimbursed at the rates in the Schedule of Rates.

131 The provision of a shower seat or wheelchair height soap dishes if required will be reimbursed at the rates in the Schedule of Rates

Electrical works:

170 The Provider is to PAT test all existing electrical appliances that are included or used in the bathroom, this work is reimbursed at the rates in the Schedule of Rates.

Client's current manufacturers/suppliers/products

172 Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand name	Manufacturer's details
Please refer to table within ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) section.		

© Rand Associates Consultancy Services Ltd

ELECTRICAL WORKS

GENERAL

Regulations

001 All electrical Works must be carried out in accordance with the applicable Standard - Requirements for Electrical Installations IET Wiring Regulations co-published by the British Standards Institution ("BSI") and the Institution of Engineering and Technology ("IET").

Equipotential bonding

002 Standard: To applicable Standard
General: Connect the following metallic parts to the main earthing terminal, where they are extraneous-conductive parts to:

- metal water installation pipes;
- metal gas installation pipes, as near practical to the point of entry of the service into the premises and before any branch pipework where the meter is fitted externally.
- Where practicable the connection shall be made within 600mm of the meter outlet union where the meter is installed internally;
- central heating system pipework;
- other installation pipework (including oil and gas supply pipes) and ducting; and
- exposed metallic structural parts of the building.

003 Sizes of bonding conductors are given in applicable Standard.

Supplementary equipotential bonding

003 Standard: To applicable Standard

004 General: Within the zone formed by the main equipotential bonding, provide connections to:

- baths;
- sinks;
- exposed pipes; and
- heating systems.

005 In locations containing a bath or shower, supplementary equipotential bonding is to comply with applicable Standard

006 Sizes of supplementary equipotential bonding conductors are given in applicable Standards.

007 Electrical equipment and/or electrical circuits installed in a room containing a bath or shower shall have RCD protection, complying with applicable Standards.

008 Where all electrical requirements in the dwelling to the applicable Standard for electrical installations are met, supplementary equipotential bonding as Clause 003 may be omitted.

MATERIALS

Earth Electrode

009 Standard: to applicable Standard
General: Conductive part, which may be embedded in the soil or in a specific conductive medium, in contact with the earth;
Materials: Copper, with hardened steel driving cap, hardened steel tip and phosphor bronze coupling screws;
Mechanical protection: Each earth electrode shall be protected from mechanical damage by enclosing in a heavy duty cast-iron box with lid or a heavy duty concrete box with lid. The earth lead shall be enclosed, where exposed in heavy gauge galvanised steel conduit. Permanent labels to applicable Standard indelibly marked "Safety Electrical Earth Do Not Remove" shall be attached to the earth lead at both the meter cupboard and at the electrical electrode.

© Rand Associates Consultancy Services Ltd

Conduit/trunking/ducting

010 Do not use surface conduit or trunking without an Instruction to do so from the Client's Representative.

Steel Conduit and fittings

011 Standard: to applicable Standard
Type: Plain threadable rigid conduit;
Size: In accordance with applicable Standard;
Fittings: Circular boxes shall be malleable cast-iron;
Finish: Class 4 hot dipped galvanised;
Mounting/support: Conduit shall be secured to surfaces using galvanised steel clips/saddles;
Mounting/support: Conduit shall be secured to surfaces using galvanised steel clips/saddles
Installation: Use maximum practical lengths to minimise number of joints. Form bends by machine and remove burrs from cut ends. Use bends and or/junction boxes at changes of direction. Elbows or tees shall not be used without the consent of the Client's Representative. Conduit system to be secured using brass screws an fibre/plastic plug. Boxes must be fixed independently of conduit. Tightly screw all joints to ensure electrical continuity, with no thread showing. All threads to be treated with rust inhibiting paint. Use expansion couplings where conduit crosses movement joints in structure. Make secure connections to boxes, trunking etc., with screwed coupling and provide rubber bushes at open ends.

PVC-u conduits and fittings

012 Ensure PVC-u conduits and fittings comply with the following:
- strength: heavy gauge super high impact;
- shape/colour: round, white;
- jointing: push fit and solvent welded;
- fittings: standard;
- mounting/support: screw the conduit to surfaces using the conduit manufacturer's clips/saddles;
- use maximum practical straight lengths to minimise number of joints;
- use proprietary bends and/or junction boxes at changes of direction;
- do not use elbows, tees or site formed bends without the approval of the Client's Representative;
- secure the conduit system using boxes, plated screws and fibre/plastic plugs;
- fix boxes independently of the conduit; and
- form secure joints, using expansion couplings where recommended by the manufacturer and connectors at equipment and terminal fittings.

PVC-u surface cornice trunking system

013 Use PVC-u surface cornice trunking in conjunction with mini trunking for the mechanical protection of sub-mains cables and final circuit cables in accessible locations at ceiling level, where approved by the Client's Representative. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;
- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

PVC-u surface mini-trunking system

014 Use PVC-u surface mini-trunking for the mechanical protection of final circuit cables in accessible locations. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;
- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

Fire stopping of trunking/ducting

015 Seal trunking/ducting internally with firmly packed rock fibre or intumescent type material supplied by the trunking/duct manufacturer.

© Rand Associates Consultancy Services Ltd

Cables generally

016 Ensure cables are BASEC certified. Use cables in the locations and for the uses specified in the table below:

Location/Use:	Cable Type:
General (includes central heating, ventilation and smoke detector systems)	PVC insulated and sheathed
Conduit system (complete)	PVC insulated and sheathed or PVC insulated only
Sub-mains distribution	PVC split concentric
Sub-mains distribution armoured and PVC sheathed	PVC insulated, PVC sheathed, steel wire armour and PVC sheathed
Fire alarm system	PVC insulated and sheathed
Immersion heater (final connection)	EP rubber/HOFR sheath, Heat resistant PVC flexible cable

PVC-u insulated and sheathed cables and PVC-u insulated split concentric cables

017 Colour code cables for identification.

Electrical accessories generally (wall mounted)

018 Ensure wall mounted accessories for the connection and control of power, lighting and low voltage equipment are:

- manufactured using white moulded plastic;
- complete with surface or flush type mounting box except where specified otherwise;
- from the same manufacturer in a single installation; and
- marked to show their function where they are a control switch for e.g. an immersion heater, a cooker, a refrigerator, a washing machine or a circulating pump etc.,.

019 Ensure metal boxes for flush mounting switches and sockets are manufactured from galvanised steel complete with an earth terminal.

020 Fix all boxes using brass screws, fibre or plastic plugs.

Electrical accessories generally (ceiling mounted)

021 Ensure ceiling mounted accessories for the connection and control of power, lighting and low voltage equipment:

- are manufactured using white moulded plastic;
- are complete with mounting box where required;
- are from the same manufacturer where used in a single installation;
- are fixed with brass or sheradised screws, with fibre or plastic plugs as required; and
- in conduit systems have a white insulated break-ring between the ceiling roses and cord switches and the respective terminal boxes.

Consumer unit

022 Ensure consumer units:

- have a surface non-combustible pattern unit complete with lid;
- have a main switch of 80/100 amp DP rating;
- are fitted with RCBO's to applicable Standard;
- located adjacent to the meter at the incoming supply position; and
- have each way permanently labelled to identify the circuit and rating.

023 In installations without Protective Multiple Earthing it must be a surface non-combustible unit complete with lid, fitted with RCBO's to applicable Standard and must be labelled to correspond to the following circuit allocations:

© Rand Associates Consultancy Services Ltd

Circuit No Allocations	RCBO Rating
Lighting Downstairs	6
Lighting Upstairs	6
Boiler	6
Immersion Heater	16
Kitchen Ring Main Circuit	32
Shower	45
Cooker	32
Power Ring Main Circuit – RCD/RCBO protected	32
Mains Powered Smoke Alarms	6

Residual current device/residual current circuit device (RCD/RCCD)

024 Ensure RCDs and RCCDs:
- function as both isolators and switches;
- have a current rating of 80 amp DP;
- have a sensitivity of 30m amp; and
- are complete with an insulated cover or terminal shrouds.

Residual current circuit breaker (RCCB)

025 Ensure RCCBs:
- function as both isolators and switches;
- have a current rating of 63 amp DP;
- have a sensitivity of 30mA; and
- have a white PVC enclosure.

Residual current circuit breaker with override protection (RCBO)

026 Ensure RCBOs:
- function as both isolators and switches;
- have a current rating of 80A DP;
- have a sensitivity of 30mA; and
- are complete with an insulated cover or terminal shrouds.

ISCO connectors

027 For ISCO connectors ensure:
- the covers and bases are manufactured from black phenolic resin material; and
- the connector blocks are manufactured from brass with electro-tin finish.

Door bells

028 Ensure door bells:
- are primary mains supply, transformer , 6v secondary outlet;
- have a white bell push PVC-u cover; and
- are screw fixed.

Bulkhead light fitting (fluorescent) (metal base)

029 Ensure metal base bulkhead light fittings:
- have a corrosion resistant die-cast or pressed metal base complete with a vandal resistant diffuser;
- have the wiring within the fitting protected by heat resistant sleeving;
- are installed complete with a 20W compact fluorescent lamp with integrated control gear;
- lamp efficacy to be greater than 45 lumens per circuit-watt;
- controlled manually by Customers; and
- are screw fixed.

© Rand Associates Consultancy Services Ltd

Bulkhead light fittings (fluorescent) (polycarbonate base)

030 Ensure polycarbonate base bulkhead light fittings:
- have a heavy duty polycarbonate base with a vandal resistant diffuser;
- have the wiring within the fitting protected by heat resistant sleeving;
- are installed complete with a 20W compact fluorescent lamp with integrated control gear;
- lamp efficacy to be greater than 45 lumens per circuit-watt;
- controlled manually by Customers; and
- are screw fixed.

Photocell sensor

031 Ensure sensors to control the landlord's lighting installation are:
- complete with a baseholder and wall mounting bracket;
- screw fixed to masonry or concrete; and
- fixed in a position approved by the Client's Representative.

TV aerial installation

032 Ensure TV aerial installations:
- consist of 20mm diameter PVC-u conduit complete with co-axial cabling run from roof level; and
- terminate at a white plastic surface mounted outlet box complete with a white plastic cover plate with single co-axial TV outlet.

Time switch (24 hour)

033 Ensure time switches:
- have a 24 hour and quartz control mechanism;
- are a 20 amp single pole, single throw time switch; and
- have 2 'on' and 2 'off' programmes with a day omitting device and independent motor connections.

Smoke detectors

034 Ensure smoke detectors:
- have white PVC-u for the housing;
- have a minimum 10 year life expectancy;
- include a photo-electronic sensor to applicable Standard;
- are 240 V mains operated with a sealed-in rechargeable Lithium cell back up supply; and
- include a full function test/hush button control, automatic reset, Green and Red LED indicators to confirm alarm status and low power cell warning signal.

Heat detectors

035 Ensure heat detectors:
- have white PVC-u housing;
- have a minimum 10 year life expectancy;
- comprise a fixed temperature fast response thermistor sensor with a range of 54^{o} – 62^{o} centigrade to applicable Standard;
- are 240V mains operated with a sealed-in rechargeable Lithium cell back up supply; and
- include or have a test button control function, Green and Red LED indicators to confirm alarm status and low power cell warning signal.

Carbon monoxide detectors

036 Ensure carbon monoxide detectors:
- have white PVC-u housing;
- have a minimum 10 year life expectancy;
- incorporate an electrochemical cell sensor module;
- are battery operated to applicable Standard fixed with security screws to ceiling;
- sensor power pack life 10 years;
- include a continuous self check function monitor with test/hush facility;
- have a pre-alarm warning LED;

© Rand Associates Consultancy Services Ltd

- include LEDS for battery power pack life, CO level and fault status; and
- have a CO gas test feature.

Fixing electrical accessories/equipment

037 Position accessories accurately and squarely to the vertical and horizontal axes. Where not shown otherwise, align adjacent accessories on the same vertical or horizontal axis (as appropriate). Agree the mounting heights with the Client's Representative.

Multi-gang switches

038 Connect switches so that there is a logical relationship with the lights.

WORKMANSHIP

Installation generally

039 Install, test and commission the electrical work in accordance with the applicable Standards for electrical installations and the design and performance requirements set out in this Section so as to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.

040 Ensure all installation Works are carried out by qualified electricians fully conversant with the applicable Standards for electrical installations to good workmanship by skilled (electrical) or instructed (electrical) persons and proper Materials shall be used in the electrical installation.

041 Do not allow the number of Apprentices and Trainees at a Property to exceed the number of qualified electricians.

042 Ensure all installation Works are carried out under the direct supervision of a "Qualifying Manager" named in the List of Approved Contractors issued by the National Inspection Council for Electrical Installation Contracting (or equivalent).

043 Use only the types of fastenings, bushes, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation that are recommended by the manufacturer of the electrical equipment being installed.

044 Avoid contact between dissimilar metals. Use corrosion resistant fastenings in locations where moisture is present or may occur.

045 Rectify, free of charge to the Contract, any Work which in the opinion of the Client's Representative has not been properly executed and must replace free of charge to the Contract any Materials which do not comply with this Specification.

046 Confirm the voltage and frequency of the supply before ordering any equipment.

047 Include in his tender for the provision of all fixings and the making good by qualified tradesmen to the satisfaction of the Client's Representative all damage to walls, ceilings, decorations and fitments.

048 Dust sheets are to be used and every consideration given to Customer's property.

049 After work is completed each day all systems will be left in a safe usable condition and all dust and mess cleared up.

Circuit chart

050 Standard to applicable Standard
Regulation No. 514.9.1
Requirements: For simple domestic electrical installations the information required in Regulation 514.9.1 may be given in a Schedule
Schedule: A laminated durable copy of the Schedule relating to the Consumer Unit(s) shall be provided securely fixed within or adjacent to each Consumer Unit.

© Rand Associates Consultancy Services Ltd

Electricity supply

051 Note that the electricity supply is nominally 240 volt AC, single phase, 50 hertz, 2 wire.

System of wiring

052 For concealed wiring, use PVC sheathed 600/1000 volt grade cable of the size and type specified. Wherever possible, run it in within floor, roof and ceiling voids.

053 Run cables along the sides of joists at the mid point. Clip them at 450mm centres using cable clips of tinned brass secured by nonferrous fixing pins, screws, clips or a similar fixing. Support the wire and equipment located between the joists by a wood bearer of a size of at least 100x25mm.

054 Install the cable:
- with a minimum clearance of 150mm to all heating, gas and waste pipes or ducts; and
- physically separated from other wiring not associated with lighting and power supplies.

055 Where cables cross flooring joists they must be passed through small holes drilled through the centre of the joists. These holes must not exceed 25mm diameter.

056 Ensure cables leaving or crossing joists do so at right angles to the longitudinal side of the joist, on trusses or binders. Do not notch or saw joints. Ensure that cables do not run in positions where they are susceptible to damage by floor nails.

057 Do not run cables in roof spaces on the top of joists or insulation. All cables in a roof space shall be clipped to horizontal timber tray supported on battens secured above roof trusses and kept clear of thermal insulation.

058 Install cables leaving roof voids and within floor spaces or passing through any part of the structure in conduit or trunking as specified.

059 Ensure cables in solid floor that are either laid in screed or in a ceiling void are drawn in through rigid PVC-u conduit as specified and run continuously from the consumer unit to the outlet served.

060 Do not install cables within wall cavities.

061 Contain all wiring to each flat within that flat.

062 Fit conduits complete and then draw the cable through.

063 Cables must be protected, supported and fixed to the requirements of the applicable Standards for electrical installations and all other Regulatory Requirements.

Cables installed in plastered walls

064 Protect cables by rigid PVC-u metric super high impact heavy gauge conduit where no conduit exists at present. Reuse existing conduit where approved by the Client's Representative.

065 Ensure new conduits are in continuous lengths, smooth in bore, true in size, and terminating in roof spaces and within floor spaces with a minimum projection of 50mm. Provide inside outlet boxes with a universal cleat.

066 Ensure new conduits are vertical and chased into the wall, such that the finished wall will provide a minimum of 10mm plaster cover. Adequately fix the conduit with sheradised nails and saddle clips, such that during the plastering processes, there is no tendency for plaster to push the conduit forward and reduce the cover.

Cables installed in plasterboard partitions

067 In plasterboard partitions with a timber core, draw cables through the partition between the timber studding and noggins. Where timber work occurs, take the cable over the face of the timber by a small chase through the plasterboard and into the timber. Make good the chase with a suitable plaster material finished smooth and flush. Ensure cables installed in partitions are vertical.

© Rand Associates Consultancy Services Ltd

068 Take due account of any insulation within the partition when sizing the cables so as to prevent overheating.

Conduit installed on the surface

069 Use super high impact light gauge PVC-u metric rigid conduit and accessories on fairfaced brickwork or unplastered surfaces in heating cupboards, stores, garages, plant rooms, meter compartments and similar areas.

070 Support the conduit by PVC-u spacer bar saddles and wood screws and rawlplugs at intervals not exceeding 400mm.

071 Allow for the expansion of PVC-u conduit.

072 Install the conduit only vertically or horizontally.

Where new cables are to be installed in or under solid floors

073 Protect cables by rigid PVC-u round super high impact heavy gauge conduit laid in continuous lengths from the consumer unit to the outlet served, run in a diagonal line. Use the proper outlet and inspection bends and tees. Adequately fix the whole system to avoid any displacement by subsequent building trades.

Requirements for PVC-u conduit systems

074 Install no more cables in each circular conduit than necessary to permit easy insertion and withdrawal. Do not install more than the maximum recommended in the applicable Standards for electrical installations. Demonstrate to the Client's Representative that cables can be easily withdrawn and inserted in any section of the installation. If this cannot be done using the existing conduit, then provide new conduit.

075 Use conduits, boxes, fittings and accessories from the same manufacturer and with suitable fixings for the application. Ensure circular conduit is at least 20mm in diameter.

076 Ensure PVC-u outlet boxes and equipment do not become distorted during plastering. Install boxes flush with the finished plaster and the sides vertical, using 1.25" No. 8 woodscrews and rawlplugs or equivalent fixing.

Use of cable trunking

077 Use cable trunking to improve the appearance at points in the installation where a number of conduits terminate or share a common route, and/or at the meter intake positions for the formation of distribution board/local isolator assemblies. Use compact miniature trunking of the appropriate size.

078 Use PVC-u trunking with fitted end covers. Provide a separate earth continuity conductor.

079 Connect trunking to equipment by appropriate screwed couplers, bushes and shakeproof washers, or flanged couplings.

080 Connect trunking to PVC-u conduit by "threaded to plain" adaptors with lock nuts, or clip in adaptors.

081 Clean out trunking before cable is drawn in.

082 Ensure the number of cables installed in trunking does not exceed the space factor specified in applicable Standard

Conductors

083 Ensure all cables comply with British Cable Association recommendations (or equivalent).

084 Carefully remove any insulation in making terminations without causing damage to the conductor. Double the wiring to fill the terminations.

085 Take the sheath of PVC-u sheathed cable inside the outlet boxes or the pattress of ceiling fittings and similar equipment.

© Rand Associates Consultancy Services Ltd

086 Securely clamp flexible cords and fit suitable grommets to all terminal boxes.

087 Use cables of the following types and sizes complete with integral earth continuity:

Concealed wiring - copper 2 core and earth PVC 600/1000 volt grade	
Lighting sub-circuits - 1.5mm sq	Dependent upon length of circuit and to comply British Standard
Boiler circuits - 1.5mm sq	
Ring circuits - 2.5mm sq	
Radial circuits - 2.5mm sq	
Cooker circuit - 10.0mm sq	
Shower circuit - 10.0mm sq	
2/3 Kw Immersion Heater - 2.5mm sq	
3 Kw Water Heater - 2.5mm sq	
Flexible cords and cables - heat resistant insulation 300/500 volt grade	
Lighting - pendant lamp holder	0.75mm sq 2 core heat resistant silicone rubber insulated white circular
Lighting - final internal connection for enclosed tungsten fittings in bathrooms, garages, and for exterior light fittings	0.75mm sq 3 core heat resistant butyl rubber
2/3 Kw Immersion heater	2.5mm sq EP rubber/HOFR sheath or heat resistant PVC flexible cable
3 kw Water heater	2.5mm sq EP rubber/HOFR sheath or heat resistant PVC flexible cable

Lighting Circuits

088 Install wiring by the loop-in system. Ensure there are no joints or connectors in the final-circuit from the consumer distribution unit.

089 Install a maximum of two live pairs and one switch pair at each point. Install the wiring for 2-way switching between switch points. Terminate the earth conductor in each lighting and switch point.

090 Install lighting points and arrange the system such that:
- 2/3 bedroom Properties are provided with two 6 amp circuits; and
- small 1 bedroom Properties are provided with one 6 amp circuit in the consumer distribution unit.

091 Limit the number of points controlled by one 6 amp RCBO way to 10. If an installation has an excess of 20 lighting points then provide three 6 amp RCBO circuit ways.

092 Ensure pendant type cord grip, all insulated lampholders and ceiling roses are white plastic and are complete with 225mm of flexible cable as specified for a standard height ceiling. For non-standard Properties, adjust the length of the flexible cable to give a 2.1 metre (7ft) clearance from the lampholder to the floor. Ensure lampholders are all of the insulated heat resisting pattern.

093 Ensure interior light switches (except in bathrooms) are white plastic, flush fitting, single pole, rocker operated 5 amp AC units, mounted in boxes with adjustable fixing lugs. Gang the switches as required, using a multiple plate cover.

094 Where flush fittings and switches cannot be used, mount single pole rocker operated 5 amp AC surface type switches on matching moulded white plastic boxes.

095 Install light switches at a distance of between 450 and 1200mm above the floor level to the centre of the switch, and at least 150mm from the nearest door frame, unless the Client's Representative Instructs

© Rand Associates Consultancy Services Ltd

otherwise.

096 Ensure light switches in bathrooms are white plastic 5 amp AC surface pattern operated by a non-conductive pull cord and knob and hang not more than 900mm above floor level. Fit them close to the wall and well clear of the door to the room.

097 Support ceiling fittings that are wired and located between joists by wooden bearers of a minimum size of 100x25mm fixed to the joists at both ends of the bearer.

098 Do not provide lamps except where specifically required by the Schedule of Rates.

13 amp ring circuit installation

099 Connect sockets in ring circuits without spurs using cable as specified, with both ends of each circuit terminated in one 32 amp RCBO at the consumer distribution unit.

100 Prevent overloading of circuits by providing specified appliances with separate final-circuits.

101 For Properties with a total internal floor area not exceeding 100 square metres on a single level, provide one ring circuit with appropriate numbers of sockets or fused connection units connected to the ring and one kitchen ring main.

102 Properties with a total internal floor area exceeding 100 square metres or Properties on two or more levels, are to have a minimum of two ring circuits with the appropriate number of sockets or fused connection units connected to the ring, in addition to a kitchen ring main.

103 Locate sockets and fused connector boxes in the same positions as those existing. Ensure they are 13 amp 3 pin white flush pattern. Gang sockets as required, with a multiple plate cover.

104 Use surface pattern sockets protected with a RCBO device in garages, and elsewhere on fair face brickwork.

105 Ensure sockets have switches unless otherwise specified.

106 Ensure the positions of sockets relative to the floor level are as follows:

Location	**Dimensions for socket outlets to floor level**
Garages, laundry areas	450mm - 1200mm
General living areas, hall, landings, etc.	450mm - 1200mm
Elderly persons' Properties	450mm - 1200mm
Bedrooms (except elderly persons' Properties)	450mm - 1200mm
Kitchens (preferred dimension from bottom of outlet to worktop)	Within 100mm and 300mm above worktop level

107 In kitchens, where necessary, increase the above dimensions to ensure a satisfactory match with the layout of the wall tiles. Sockets to be aligned level with each other throughout the room. Agree the exact position of sockets with the Client's Representative before installation to ensure a satisfactory position in relation to storage cupboards and shelves, etc.

108 Recess socket boxes into the walls to just below plaster level and provide them with adjustable fixing lugs.

Cooker circuit

109 For cooker circuits, provide one final-circuit connected to one 32 amp RCBO at the consumer distribution unit using cable as specified.

110 Locate a flush fitting, white plastic cooker control unit with a 45 amp DP main cooker control switch, complete with neon indicator, horizontally within 150-1200mm maximum from the edge of the cooker spaces Instructed

© Rand Associates Consultancy Services Ltd

by the Client's Representative. Ensure the dimension from the top of the unit to the floor is 1400mm and from the side of the cooker to the centre line of the unit is 150mm. Where a Customer owns a separate hob and oven, provide a separate 45A DP switch and cooker connection unit below worktop for each appliance.

111 Ensure a cooker control unit that is located between storage cupboards or shelves and working top surfaces aligns with other sockets around the worktop.

112 Connect the cooker circuit in the cooker control unit. Extend it to terminate in a cooker cable connector outlet mounted 450mm above the finished floor level and immediately adjacent to the cooker. Terminate the cooker wiring at the cooker connector outlet box where no electric cooker is provided. Connect the cooker if the Customer has one.

Immersion heaters

113 For heater circuits, provide one final sub-circuit connected to one 16 amp RCBO at the consumer distribution unit using cable as specified.

114 Provide for the heater to be controlled by a heating boost switch to applicable Standards located above the worktop in the kitchen with a 20A switch located adjacent to the hot water cylinder in the hot press.

115 Use flush fitting units where switches are located outside the hot press. Where flex outlets are located inside the hot press, use either surface or flush fitted units.

116 Terminate the circuit adjacent to the heater using suitable cable and 20A switch. Make the final connection with heat resistant flexible cable as specified and run so as to prevent the hanging of clothes, etc., on the cable.

117 When the supply cable is exposed within a hot press, protect cables with mini-trunking as specified.

Showers

118 For shower circuit, provide one final sub-circuit connected to one 45amp RCBO at the consumer distribution unit using cable as specified. Provide for the shower to be controlled as near as practicable to the shower unit, by a white 45amp AC, DP neon light or indicating flag pull cord switch located in bathroom.

119 New showers are to ne 8.7KW electric shower unit to applicable Standard, BEAB, BEAB CARE, RNIB, CE marked and WRAS approved complete with installation set maximum temperature control, phased shut down, low pressure indicator, installation set timer setting, including plugging walls as necessary, connect to water and electrical supplies including provision of shower circuit including mini-trunking or rigid PVC-u conduit chased to walls etc., incorporating RCBO protection, controlled with 45A DP switch with neon light or indicator flag, all adjustments to pipework, adjust electrical supply as necessary, fill, test, and undertake tests, provide certificate, and remove all waste.

120 Showers are to be supplied with fixed sliding rail, twist and lock shower head mechanism, shower hose with adjustable shower head outlet and soap dish.

Smoke Heat Detectors

121 Smoke alarms must be approved by the Client's Representative and must be installed to applicable Standard and must be of the mains powered type. The mains power must be supplied from an independent circuit of the distribution board and protected by a suitably rated RBCO breaker. The Provider must provide the necessary wiring for interconnection of the units. Installation must be strictly as specified by the manufacturer. One set of instructions must be left on site for Customers' use. The alarm system shall be tested and a certificate supplied to the Client's Representative in accordance with the applicable Standards.

122 Detectors must be mains operated with either battery or capacitor back up.

123 In premises of two levels, an optical detector is required in each of the circulation spaces and the main habitable room. Manufacturer's technical data sheet requirements must be strictly adhered to.

124 Wiring must be in PVC twin and earth cable looped from an independent circuit at the distribution board.

© Rand Associates Consultancy Services Ltd

125 Interconnection must be made using PVC triple and earth cable between the two detectors, using the third core for interconnection, such that in the event of either surrounding the other must also sound.

Installation control and distribution

126 Install, test and commission the electrical work in accordance with the applicable Standards for electrical installations ensuring compliance with design and performance, to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.

127 Ensure the consumer equipment consists of a non-combustible metal consumer unit with lid complying with applicable Standard complete with:
- main control switch to applicable Standard;
- sufficient RCBO's to accommodate all the sub-circuits scheduled for the Property; and
- additional 20% spare way capacity to the number of electrical circuits installed.

128 Ensure sufficient space is available for the Utility Provider's metering and service cutouts. If required, provide a panel which satisfies the requirements of the Utility Provider for mounting meters, cutout and other equipment.

129 Supply and install PVC connection tails to the Utility Provider's point of supply, using correct coding and matching the cross sectional area to the main isolating switch rating.

130 Upgrade all earthing and bonding to conform to applicable Standard. Do not use metal trunking as an earthing conductor.

131 Meter tails are to be neatly fixed and clipped as specified.

132 Provide all equipment white in colour.

133 Clearly identify each way on distribution equipment.

134 Ensure the mounting height of equipment is such that persons of average height can reach all fuses, switchgear, etc., from floor level without assistance.

135 Conceal cables above the ceilings and maintain access to the cable runs.

136 Enclose cables run in cupboards in mini-trunking.

137 Before and on starting the Works, obtain approval from the Client's Representative to the proposed routes of cable runs and wiring circuits.

138 Agree any alterations to the agreed routes of wiring circuits with the Client's Representative before starting the Works on them.

139 If Works are carried out before having agreed the routes with the Client's Representative, return and reroute and rewire cable runs and circuits where Instructed by the Client's Representative.

Standardisation of components

140 Use matching components with all lighting switches, sockets, fused spurs and similar equipment used in the Works, being from the same manufacturer.

Customer's fittings

141 Refix any existing fittings installed by the Customer, provided the fitting conforms to applicable Standard.

142 Notify the Client's Representative of any Customer's fitting which does not meet applicable Standard and which will therefore not be rewired or reconnected.

Removal of floor boarding, etc

143 Carefully remove any floor boarding necessary for the installation of cables. Saw through the tongues only

© Rand Associates Consultancy Services Ltd

and replace the boards in a workmanlike manner. Joists to be drilled only for the installation of cables. Ensure any new floor boarding is identical in width and thickness. Remove all debris from the joist and roof spaces.

144 Make good all plaster disturbed by the removal of fittings to a true and level surface.

145 Do not disfigure timber frames and mouldings by sawing or chiselling out for the insertion of cables.

146 Where the removal of mouldings, etc. is necessary, ensure the replacement is carried out by a qualified tradesman and that the replacement surface matches the existing surface.

Existing roof insulation

147 Where the roof insulation must be moved for the electrical installation, carefully move it to one side. On completion of the electrical Works carefully replace it to its original position. Take care to cover lengths of cable with insulating material to ensure the current rating of the cable(s) is not unduly altered.

Removal of old cables and fittings

148 Remove old cables and redundant switches, sockets, clips, boxes, etc. from roof spaces, exposed walls and other noticeable places and make good any disturbed surfaces.

COMPLETION

Inspection and testing

149 Ensure that on completion and before being energised, any installation is tested in accordance with applicable Standard.

150 Give not less than 24 hours' notice to the Client's Representative before commencing the testing.

151 After satisfactory completion of tests, submit copies of all inspection and completion certificates, with all associated schedules and test results if applicable, to the Client's Representative.

152 Note the testing instrument serial numbers on the test certificates.

153 All charges for testing or re-testing must be borne by the Provider.

154 The Provider must provide all the test instruments and test equipment required, make all arrangements for connections of the mains supply and issue to local authority supply company all appropriate test notices.

155 The Provider must affix to the distribution board a notice in accordance with applicable Standard.

Report and certificates

156 Ensure all inspections, reports and test certificates and forms are the current version at the time of the test and are in the standard format published by IET, the National Inspection Council for Electrical Installation Contracting (NICEIC), the Electrical Contractors' Association (ECA) or other certifying and testing body approved by the Client's Representative.

157 For minor Works or alterations to an electrical installation which involve a change or modification to an existing single circuit, provide a certificate for Minor Electrical Installation Works.

158 Issue an Electrical Installation Completion Certificate for Major Works or alterations to electrical installations which involve:
- a change or modification to two or more existing circuits;
- the addition of one or more new circuits to an existing installation; or
- a new installation.

159 Provide an electrical installations condition report when specifically Instructed by the Client's Representative.

© Rand Associates Consultancy Services Ltd

Operating Instructions

160 Each consumer unit must be supplied with an operating instruction card which must be mounted adjacent to the unit.

161 The Provider must leave with the Customer printed instructions regarding operation of the consumer unit trip switch.

162 The instruction leaflet for the smoke detectors must be left in a safe place either by the electricity meter or consumer unit.

Client's current manufacturers/suppliers/products

163 Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand Name	Manufacturer's Details
Please refer to table within ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) section.		

© Rand Associates Consultancy Services Ltd

ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES)

PERFORMANCE SPECIFICATION FOR ELECTRICAL INSTALLATIONS

COMPLIANCE WITH REGULATIONS

001 The whole of the electrical installation must comply with the following regulations and requirements including all revisions and amendments applicable at the time.

1. Building Regulations
2. Electricity supply company regulations
3. applicable Standards and Codes of Practice
4. The Health and Safety At Work etc Act 1974
5. Electrical Equipment (Safety) Regulations
6. Electricity at Work Regulations 1989

002 Within the scope of this specification and the schedule, the Provider must be responsible for the full design, installation, test, inspection and certification of the installation.

003 Certification must be made using Electrical Installation Certificates.

Materials and Workmanship

004 Only new Materials must be used.

005 The whole of the installation must be executed in a proper and workmanlike manner.

006 Rectify, free of charge to the Contract, any work which in the opinion of the Client's Representative has not been properly executed and must replace free of charge to the Contract any materials or goods which do not comply with the Specification.

007 Confirm the voltage and frequency of the supply before ordering any equipment. This will nominally be 240v ac. 50 Hz single phase.

General

008 Include in his tender for the provision of all fixings and the making good by qualified tradesmen to the satisfaction of the Client's Representative all damage to walls, ceilings, decorations and fitments.

009 Dust sheets are to be used and every consideration given to Customer's property.

010 After work is completed each day all systems will be left in a safe usable condition and all dust and mess cleared up.

Consumer Unit

011 The consumer unit must be located adjacent to the meter at the incoming supply position.

012 In installations without Protective Multiple Earthing (PME) it must be a non-combustible consumer unit with lid. RCBO's must be labelled to correspond to the following circuit allocations:

© Rand Associates Consultancy Services Ltd

Circuit No Allocations	RCBO Rating
Lighting Downstairs	6A
Lighting Upstairs	6A
Immersion Heater	16A
Kitchen Ring Main Circuit	32A
Cooker	32A
Power Ring Main Circuit(s)	32A
Mains Powered Smoke Alarms	6A

013 Each consumer unit must be supplied with an operating instruction card which must be mounted adjacent to the unit.

014 Leave the Customer printed instructions regarding operation of the consumer unit trip switch.

Wiring

015 The installation must be carried out using PVC British Approved Service for (BASEC) certified, PVC insulated and sheathed cables to applicable Standard. Minimum cable sizes must be as follows:

Lighting circuit	1.5mm2 with earth conductor
Power Ring Main Circuit	2.5mm2 with earth conductor
Cooker Circuit	6.0mm2 with earth conductor
Immersion Heater Circuit	2.5mm2 with earth conductor
Kitchen Ring Main Circuit	2.5mm2 with earth conductor
Mains Earth Connectio0n	16.0mm2
Equipotential Bonding	10.0mm2
Supplementary Bonding	4.0mm2

016 Cables must be concealed where possible within the roof void or within floor space and wiring in walls which are plastered must be run in chased-in-high impact PVC-u conduit.

017 Where cables cross flooring joists they must be passed through small holes drilled through the centre of the joists. These holes must not exceed 25mm diameter. Cables must be clipped to the sides of joists by means of plastic cable clips. All cables must be positioned to avoid damage and must be adequately secured. The wiring to power circuits must be carried out on the ring main system. Spur connections will not be permitted.

018 The wiring to lighting circuits must be carried out using the three-plate ceiling rose system, no junction boxes being permitted, all connections being made at the ceiling rose or lighting switch.

019 Separate circuits must be provided for upstairs lighting, downstairs lighting, ring main circuit and kitchen ring main circuit

Earthing and Bonding

020 The method of primary earthing must be as required by the appropriate electricity supply company regulations.

021 Where an earth is made available by the supply authority, this must be used, the Provider being responsible for any negotiation with the authority.

022 The main earthing terminal shall be connected with earth by one of the methods described in the applicable Standard, as appropriate to the type of system of which the installation is to form a part and in compliance with that applicable Standard.

© Rand Associates Consultancy Services Ltd

023 Main protective bonding conductors are required to connect extraneous-conductive parts to the main earthing terminal of the installation in compliance with the applicable Standard.

024 Comply fully with the Regulations regarding the protective bonding of exposed conductive parts and ensure that cross-bonding of hot and cold water pipes, metalwork and steel sinks is carried out where applicable.

025 Earth rods must be protected by purpose made inspection pits set neatly and firmly in the ground.

026 The earth wire must be enclosed in HGS galvanised conduit taken directly into the inspection pit.

027 The inspection pits shall protect from mechanical damage each earth electrode by enclosing in a heavy duty cast iron box with lid, or a heavy duty concrete box with lid.

Immersion Heater Circuit

028 A separate immersion heater circuit shall be provided from the consumer unit to the immersion heater control unit. The connection to the immersion heater must be a 3-core heat resistant flexible cable to applicable Standard with 2A local isolation switch.

029 The immersion heater switch shall be controlled by a heating boost switch, with time control settings, and fixed to a flush metal box to applicable Standard located the kitchen above the work top.

Smoke Alarms

030 Smoke alarms must be approved by the Client's Representative and must be installed to BS 5839-6 and must be of the mains powered type. The mains power must be supplied from an independent circuit from the consumer unit and protected by a suitably rated RCBO. The Provider must provide the necessary wiring for interconnection of the units. Installation must be strictly as specified by the manufacturer's technical data sheet. Alarms shall have a rechargeable Lithium battery power cell. One set of instructions must be left on site for Customer's use.

Testing

031 On completion of the installation in each dwelling the Provider must carry out all the tests prescribed in the applicable Standard for the Requirements for Electrical Installations and must record fully the results on the Electrical Installation Certificate. These certificates must be submitted at handover.

032 All charges for testing or re-testing must be borne by the Provider.

033 Provide all the test instruments and test equipment required, make all arrangements for connections of the mains supply and issue to local authority supply company all appropriate test notices.

034 Fix in accordance with the applicable Standard in a prominent position at or near the origin of every installation upon completion of the work carried out, a notice of such durable material as to likely to remain legible throughout the life of the installation.

INSTALLATION OF MAINS OPERATED SMOKE ALARMS

Provision

035 Detectors shall be mains operated with either battery or capacitor back up.

Fitting

036 In dwellings of two or more levels, an optical detector is required in each of the circulation spaces and the main habitable room, with a heat detector fitted in the kitchen. The manufacturer's technical data sheet must be strictly adhered to.

Wiring

037 Cables shall be in PVC twin and earth cable looped from an independent circuit from the consumer unit.

© Rand Associates Consultancy Services Ltd

038 Interconnection shall be made using PVC triple and earth cable between the detector heads, using the third core for interconnection, such that in the event of an alarm, all detector heads will sound.

Instructions

039 The instruction leaflet must be left in a safe place either by the electricity meter or consumer unit.

Lighting and Power Requirements etc.,

040 Main Bedroom:
Ceiling light pendant and switch 2 No. double switched socket outlets

041 Other Bedrooms:
Ceiling light pendant and switch 2 No. double switched outlet sockets

042 Hall/Stairs/Landings:
Ceiling light pendants top and bottom of stairs with 2 way switching
1 No. double switched socket outlet
1 No. smoke detector per level

043 Bathroom/WC:
Ceiling mounted totally enclosed light fitting with ceiling pull cord
Wall mounted extractor fan with a 15A ceiling pull cord with 3A fused connection unit

044 Living Room:
Ceiling light pendant and switch 3 No. double switched socket outlets
1 No. smoke detector

046 Dining Room:
Ceiling light pendant and switch 2 No. double switched socket outlets

047 Kitchen:
Ceiling light pendant and switches;
Kitchen Ring Circuit with 3 No. double switched socket outlets above work top level and 1 No. double socket outlet in Dining Area;
Cooker Circuit with 45A DP switch with neon indicator above worktop, cooker connection unit behind appliance;
Water Heater Circuit with heating boost switch above worktop, 20A DP switch in hot press/airing cupboard;
Cooker Hood Circuit with 20A DP switch with neon indicator above work top, fused connection unit (3A) adjacent hood;
Fridge Circuit with 20A DP switch with neon indicator above worktop, unswitched single socket outlet below work top;
Washing Machine Circuit with 20A DP switch with neon indicator above worktop. unswitched single socket outlet below worktop;
Where required, provide an electrical circuit for a dishwasher or tumble dryer, or both as necessary;
All double pole (DP) switches shall be engraved so as to indicate its appropriate function
1 No. heat detector

© Rand Associates Consultancy Services Ltd

Client's current manufacturers/suppliers/products

048 Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand name	Manufacturer's details
Consumer Unit and RCBO's		Wylex Metal
Batten Lamp Holder		Hager
Pendant lamp Holder		Hager
Ceiling Lighting Switch		Hager
Lighting Plate Switches		Hager
PVC Back Boxes and PVC Trunking		Marshall Tufflex Range
Switched Socket Outlet DP – Twin and Single		Hager
Immersion Heater Switch – 20A DP Switch with Neon		Hager
Smoke Detectors		AICO
Carbon Monoxide Alarm		AICO
40A DP Ceiling Shower Switch		Hager
45A D P Switch for Cooker		Hager
Cooker Cable outlet With Terminals		Hager
Fused Connection Units		Hager
Flex Outlet Plate		Hager
External Light Fitting		Robust 10W LED
Bathroom Light Fitting		Robust 10W LED

© Rand Associates Consultancy Services Ltd

Product	Brand name	Manufacturer's details
Kitchen Light Fitting		Strip Light LED
Extractor Fans		Nuaire Cyfan / Envirovent

© Rand Associates Consultancy Services Ltd

Rewiring of Dwellings

016 **Typical Lighting and Power Requirements etc., TO FLATS AND BUNGALOWS**

LOCATION	1 BEDROOM FLAT/BUNGALOW	2 BEDROOM FLAT/BUNGALOW	3 BEDROOM FLAT/BUNGALOW	BEDSIT FLAT
Main Bedroom:	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	2 No. Ceiling light pendant and switch; 2 No. double switched socket outlets 1 No Smoke Detector
Second Bedroom		1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	
Third Bedroom			1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	
Hall:	2 No. Ceiling light pendants with 2 way switching; 1 No. Double switched socket outlet; 1 No. Smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. Double switched socket outlet; 1 No. Smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. Double switched socket outlet; 1 No. Smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. Double switched socket outlet; 1 No. Smoke detector;
Bathroom:	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;

© Rand Associates Consultancy Services Ltd

LOCATION	1 BEDROOM FLAT/BUNGALOW	2 BEDROOM FLAT/BUNGALOW	3 BEDROOM FLAT/BUNGALOW	BEDSIT FLAT
Living Room:	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No Smoke Detector	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No Smoke Detector	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No Smoke Detector	
Dining Room:		1 No. Ceiling light pendant and switch; 1 No. double switched socket outlets;	1 No. Ceiling light pendant and switch; 1 No. double switched socket outlets;	
Kitchen:	1 No ceiling light pendant with 2 No.2 way switches; 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. Cooker hood and 20A DP switch (engraved cooker hood)and fused connection adjacent hood; 2 No. 20A DP switches (engraved washing machine, and fridge) with un-switched socket below worktop and switch above with neon light; 1 No. Heating boost switch for immersion heater; 3 No. Double switched socket outlet above worktop level; 1 No. Heat detector;	1 No ceiling light pendant with 2 No.2 way switches 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. Cooker hood and 20A DP switch (engraved cooker hood)and fused connection adjacent hood; 2 No. 20A DP switches (engraved washing machine, and fridge) with un-switched socket below worktop and switch above with neon light;; 1 No. Heating boost switch for immersion heater; 3 No. Double switched socket outlet above worktop level; 1 No. Heat detector;	1 No ceiling light pendant with 2 No.2 way switches 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. Cooker hood and 20A DP switch (engraved cooker hood)and fused connection adjacent hood; 2 No. 20A DP switches (engraved washing machine, and fridge) with un-switched socket below worktop and switch above with neon light;; 1 No. Heating boost switch for immersion heater; 3 No. Double switched socket outlet above worktop level; 1 No. Heat detector;	1 No ceiling light pendant with 1 No.2 way switch; 1 No. cooker control switch with cooker outlet plate behind appliance; 1 No. Cooker hood and 20A DP switch (engraved cooker hood)and fused connection adjacent hood; 2 No. 20A DP switches (engraved washing machine, and fridge) with un-switched socket below worktop and switch above with neon light;; 1 No. Heating boost switch for immersion heater; 3 No. Double switched socket outlet above worktop level; 1 No. Heat detector;
Telephone	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point
Meter Cupboard	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding
Front and Rear external elevations:	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches

© Rand Associates Consultancy Services Ltd

017 Typical Lighting and Power Requirements etc., TO HOUSES

LOCATION	1 BEDROOM HOUSE	2 BEDROOM HOUSE	3 BEDROOM HOUSE	4 BEDROOM HOUSE
Main Bedroom:	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	1 No. Ceiling light pendant and switch; 2 No. double switched socket outlets	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets
Second Bedroom		1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;
Third Bedroom			1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;	1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;
Fourth Bedroom				1 No. Ceiling light pendant and switch; 2 No. double switched outlet sockets;
Hall:	2 No. Ceiling light pendants with 2 way switching; 1 No. double switched socket outlet; 1 No. smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. double switched socket outlet; 1 No. smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. double switched socket outlet; 1 No. smoke detector;	2 No. Ceiling light pendants with 2 way switching; 1 No. double switched socket outlet; 1 No. smoke detector;
Stairs/Landing	1 No Ceiling light pendant with 2 way switching; 1 No. smoke detector where applicable;	1 No Ceiling light pendant with 2 way switching; 1 No. smoke detector where applicable;	1 No Ceiling light pendant with 2 way switching; 1 No. smoke detector where applicable;	1 No Ceiling light pendant with 2 way switching; 1 No. smoke detector where applicable;

© Rand Associates Consultancy Services Ltd

LOCATION	1 BEDROOM HOUSE	2 BEDROOM HOUSE	3 BEDROOM HOUSE	4 BEDROOM HOUSE
Bathroom:	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. radial circuit with 20A DP switch for and including Extractor Fan with fused spur and 15A DP pull cord switch;
Separate WC:			1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. Extractor fan with fused spur and 1A DP pull cord switch;	1 No. Enclosed bathroom ceiling light fitting with ceiling pull cord; 1 No. Extractor fan with fused spur and 1A DP pull cord switch;
Living Room:	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No. Smoke Detector	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No. Smoke Detector	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No. Smoke Detector	1 No. Ceiling light pendant and switch; 3 No. double switched socket outlets; 1 No. Smoke Detector
Dining Room:			1 No. Ceiling light pendant and switch; 1 No. double switched socket outlets;	1 No. Ceiling light pendant and switch; 1 No. double switched socket outlets;

© Rand Associates Consultancy Services Ltd

LOCATION	1 BEDROOM HOUSE	2 BEDROOM HOUSE	3 BEDROOM HOUSE	4 BEDROOM HOUSE
Kitchen:	1 No Ceiling light pendant with 2No. 2 way light switches; 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. 20A DP switch (engraved cooker hood) with fused spur connection unit adjacent hood; 2 No. fused spurs (engraved washing machine and fridge) with un-switched socket below worktop and switch above with neon; 1 No. Heating booster switch for immersion heater; 3 No. double switched socket outlet above worktop level; 1 No. Heat detector;	1 No Ceiling light pendant with 2No. 2 way light switches; 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. 20A DP switch (engraved cooker hood) with fused spur connection unit adjacent hood; 2 No. fused spurs (engraved washing machine and fridge) with un-switched socket below worktop and switch above with neon; 1 No. Heating booster switch for immersion heater; 3 No. double switched socket outlet above worktop level; 1 No. Heat detector;	1 No Ceiling light pendant with 2No. 2 way light switches; 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. 20A DP switch (engraved cooker hood) with fused spur connection unit adjacent hood; 2 No. fused spurs (engraved washing machine and fridge) with un-switched socket below worktop and switch above with neon; 1 No. Heating booster switch for immersion heater; 3 No. double switched socket outlet above worktop level; 1 No. Heat detector;	1 No Ceiling light pendant with 2No. 2 way light switches; 1 No. Cooker control switch with cooker outlet plate behind appliance; 1 No. 20A DP switch (engraved cooker hood) with fused spur connection unit adjacent hood; 2 No. fused spurs (engraved washing machine and fridge) with un-switched socket below worktop and switch above with neon; 1 No. Heating booster switch for immersion heater; 3 No. double switched socket outlet above worktop level; 1 No. Heat detector;
Telephone	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point	1 No. double switched socket outlet adjacent telephone point
Meter Cupboard	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding	Consumer unit complete with RCBO's, Meter Tails, earth bonding
Front and Rear external elevations:	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches	2 No Bulkhead light fittings with internal light switches

© Rand Associates Consultancy Services Ltd

ELECTRICAL INSTALLATION ASSOCIATED WITH ELECTRIC SPACE HEATING AND HOT WATER

ELECTRICAL INSTALLATION ASSOCIATED WITH ELECTRIC SPACE HEATING AND HOT WATER

GENERAL

Regulations

201 All electrical Works must be carried out in accordance with the applicable Standards for Requirements for Electrical Installations IET Wiring Regulations co-published by the applicable Standards Institution ("BSI") and the Institution of Engineering and Technology ("IET").

COMPLIANCE WITH REGULATIONS

202 Ensure that all electrical Works comply with the following regulations and requirements including all revisions and amendments applicable at the time the Works are carried out.

a) Building Regulations
b) Electricity supply company regulations
c) applicable Standards and Codes of Practice
e) The Health and Safety At Work etc Act 1974
f) Electrical Equipment (Safety) Regulations
g) Electricity at Work Regulations

203 Design, installation, test, inspection and certification of the Works.

204 Certification must be made using the Electrical Installation Certificates.

Equipotential bonding

205 Standard: To applicable Standard
General: Connect the following metallic parts to the main earth terminal, where they are extraneous-conductive parts to:

- Metal water installation pipes;
- Metal gas installation pipes, as near as possible to the point of entry of the service into the building and before any branch pipe work where the meter is fitted;
- Where practicable the connection shall be made within 600nmm of the meter outlet union where the meter is fitted internally;
- Central heating system pipe work;
- Other installation pipe work (including oil and gas supply pipes) and ducting; and
- exposed metallic parts of the building structure;

Supplementary bonding

206 Standard: To applicable Standard

General: Within the zone formed by the main equipotential bonding, provide connections to:

- baths;
- sinks;
- exposed pipes;
- heating and ventilation systems;
- in locations containing a bath or shower in accordance with Section 701 in Part 7 of the applicable Standard for electrical installations

Protected Multiple Earthing Installations

207 In Protective Multiple Earthing (PME) installations the power circuit must be protected by a 30mA residual

© Rand Associates Consultancy Services Ltd

current circuit breaker which must form an integral part of RCBO consumer unit.

208 Where all the electrical requirements in the dwelling to the applicable Standard for electrical installations are met, supplementary equipotential as Clause 006 may be omitted.

209 **Cables generally**

CABLES GENERALLY:

Standard: To applicable Standards
Approval: applicable Approval Service for (BASEC), certified

Location/Use	Cable.
General	PVC insulated and sheathed,
Conduit system (Complete)	PVC insulated non-sheathed
Sub-Mains Distribution	PVC split concentric,
Sub-Mains Distribution	PVC insulated, PVC sheathed, steel wire armoured and PVC sheathed
Final connections to all Space Heating Appliances and Immersion Heaters	EP Rubber/HOFR Sheath or Heat resistant PVC flexible cable 85°C

210 Ensure cables are BASEC certified. Use cables in the locations and for the uses specified in the table below:

Location/Use:	Cable Type:
General (includes central heating, ventilation and smoke detector systems)	PVC insulated and sheathed
Conduit system (complete)	PVC insulated and sheathed or PVC insulated only
Immersion heater (final connection)	EP rubber/HOFR sheath

PVC insulated and sheathed cables and PVC insulated split concentric cables

211 Colour code cables for identification.

212 PVC INSULATED AND SHEATHED CABLES:
Standard: To applicable Standard
Type: PVC insulated and PVC sheathed cable, colour coded for identification.

213 HI-TUFF CABLE
Standard: To applicable Standard
Installation: As Clause 018

214 PVC INSULATED SPLIT CONCENTRIC CABLES:
Standard: To applicable Standard
Type; PVC insulated and PVC sheathed split concentric cable colour coded for identification.

215 EP RUBBER SHEATHED CABLES OR HEAT RESISTANT PVC FLEXIBLE CABLES:
Standard: To applicable Standard Type: EPR insulated and HOFR sheathed cable, or heat resistant PVC flexible, colour coded for identification.

216 MICC CABLES
Standard: To applicable Standard
Type: Mineral insulated copper cable.

217 CABLE ROUTES:

Installation: Shall be straight, vertical or horizontal and parallel to walls unless shown otherwise
Cables shall be positioned at least 150mm clear of other services
Cables running parallel and adjacent to heating pipes to be located below the pipes
Concealed cable runs in walls or partitions shall comply with applicable Standards
Concealed cable runs to wall switches and outlets shall be vertically in line with the accessory

© Rand Associates Consultancy Services Ltd

Cables installed under floors or above ceilings shall comply with applicable Standards.

218 INSTALLING CABLES GENERALLY

Standard: To applicable Standard
Installation: Internal cables should not be installed until the building is sufficiently enclosed to ensure permanent dry conditions
Cables shall be installed above ceilings, below floors and concealed in walls where practical
Cables to be able to be withdrawn through (1) access through removable floor or wall panels (2) a continuous conduit/trunking system
Cables shall be installed without joints other than at equipment and terminal fittings.
Jointing boxes or blank plates to extend electrical circuits are NOT PERMITTED
Cables shall be supported and fixed to the requirements of applicable Standards.
Cables shall be sleeved where passing through walls with conduit bushed at both ends
Cables where installed across floor joists shall be threaded holes neatly bored at least 50mm from flooring or ceiling
PVC insulated cables must not come into contact with polystyrene insulation or organic timber preservative
Cables installed within a wall or partition shall comply with applicable Standards.
Final Connections: To immersion heaters and all heating appliances shall be carried out using EP Rubber insulated/HOFF sheathed flexible cable or heat resistant PVC flexible cable

Materials

Conduit/trunking/ducting

219 Do not use surface conduit or trunking without an Instruction to do so from the Client's Representative.

PVC-u conduits and fittings

220 Ensure PVC-u conduits and fittings comply with the following:
- strength: heavy gauge super high impact;
- shape/colour: round, white or black;
- jointing: push fit and solvent welded;
- fittings: standard;
- mounting/support: screw the conduit to surfaces using the conduit manufacturer's clips/saddles;
- use maximum practical straight lengths to minimise number of joints;
- use proprietary bends and/or junction boxes at changes of direction;
- do not use elbows, tees or site formed bends without the approval of the Client's Representative;
- secure the conduit system using boxes, plated screws and fibre/plastic plugs;
- fix boxes independently of the conduit; and
- form secure joints, using expansion couplings where recommended by the manufacturer and connectors at equipment and terminal fittings.

PVC-u surface cornice trunking system

221 Use PVC-u surface cornice trunking in conjunction with mini trunking for the mechanical protection of sub-mains cables and final circuit cables in accessible locations at ceiling level, where approved by the Client's Representative. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;
- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

PVC-u surface mini-trunking system

222 Use PVC-u surface mini-trunking for the mechanical protection of final circuit cables in accessible locations. Ensure the trunking complies with the following:
- fittings: use the manufacturer's standard fittings;
- colour: white;

© Rand Associates Consultancy Services Ltd

- mounting/support: secure to surfaces using plated screws and fibre/plastic plugs; and
- use proprietary units to form junctions and changes of direction wherever possible.

Fire stopping of trunking/ducting

223 Seal trunking/ducting internally with firmly packed rock fibre or intumescent type material supplied by the trunking/duct manufacturer.

Electrical accessories generally (wall mounted)

224 Ensure wall mounted accessories for the connection and control of heating equipment are:
- manufactured using white moulded plastic;
- complete with flush type mounting box except where specified otherwise;
- from the same manufacturer in a single installation; and
- control switches for space heating appliances shall be rated at 20A DP and mounting heights as agreed with the Client's Representative.

225 Ensure metal boxes for flush mounting switches are manufactured from galvanised steel complete with an earth terminal.

226 Fix all boxes using brass screws, fibre or plastic plugs.

Consumer unit

227 Ensure consumer units:
- have a surface non-combustible enclosure complete with lid;
- have a main switch of 80/100 amp DP rating;
- are fitted with RCBO's to applicable Standard located adjacent to the meter at the incoming supply position; and
- have each way permanently labelled to identify the circuit and rating.

228 In installations without Protective Multiple Earth, it must be a surface non-combustible enclosure complete with lid with RCBO's to applicable Standard.

Circuit No Allocations	**MCB Rating**
Electric heating circuit – RCD/RCBO protected	16A
Immersion Heater	16A
Shower	45A

Residual current device/residual current circuit device (RCD/RCCD)

229 Ensure RCDs and RCCDs:
- function as both isolators and switches;
- have a current rating of 80 amp DP;
- have a sensitivity of 30m amp; and
- are complete with an insulated cover or terminal shrouds.

Residual current circuit breaker (RCCB)

230 Ensure RCCBs:
- function as both isolators and switches;
- have a current rating of 63 amp DP;
- have a sensitivity of 30mA; and
- have a white PVC-u enclosure.

© Rand Associates Consultancy Services Ltd

Residual current circuit breaker with override protection (RCBO)

231 Ensure RCBOs:
- function as both isolators and switches;
- have a current rating of 80 amp DP;
- have a sensitivity of 30mA; and
- are complete with an insulated cover or terminal shrouds.

ISCO connectors

232 For ISCO connectors ensure:
- the covers and bases are manufactured from black phenolic resin material; and
- the connector blocks are manufactured from brass with electro-tin finish.

Time switch (24 hour)

233 Ensure time switches:
- have a 24 hour and quartz control mechanism;
- are a 20 amp single pole, single throw time switch; and
- have 2 'on' and 2 'off' programmes with a day omitting device and independent motor connections.

Duoheat radiators

234 For duoheat radiators ensure:
- have a direct energy low wattage radiant element;
- have low cost off peak tariff energy retention cells;
- incorporates heat management automatic controls;
- has a child lock facility on controls;
- has electronic room temperature controls allowing user adjustment of heater output;
- has user configurable electronic automatic input charge regulator;
- can be linked to a central control programmer by either pilot wire or mains bourne signals;
- has prewired electrical connections;
- has easy fit front panel connections;
- can be floor or wall mounted;
- has simple secure wall fixings
- is slim line design with concealed outlet grille
- has white stove enamelled casing;

Economy 7 Off peak tariff heaters

235 For convector storage heaters ensure:
- are low cost off peak with automatic charge regulation;
- are combination type with independently operated built in convector heater;
- has automatic room temperature boost and time control;
- has frontal grille for heat distribution
- can be linked to a central control programmer by either pilot wire or mains bourne signals;
- can be floor or wall mounted;
- has secure wall fixings; and
- is slim line, with white stove enamelled casing;

236 For fan assisted storage heaters ensure:
- has low noise thermostatically controlled fan;
- high performance, fully automatic, integral time and temperature controls;
- has frontal grille for heat distribution;
- can be linked to a central control programmer by either pilot wire or mains wire signals;
- can be floor or wall mounted;
- has secure wall fixings; and
- is slim line, with white stove enamelled casing;

Day rate tariff h**eaters:**

237 For heaters ensure:

© Rand Associates Consultancy Services Ltd

- has convected heat for rapid warm up;
- pre-set background temperature at 5degree C below thermostat setting;
- has electronic thermostatic control providing room temperature stability to +- 0.3degree C
- has 24hour electronic digital timer
- has plug in electronic single zone pilot wire programmer;
- has plug in electronic runback timer;
- can be linked to a central control programmer by either pilot wire or mains bourne signals;
- is wall mountable;
- has secure wall fixings; and
- is slim line, with white stove enamelled casing; and
- is splash proof to IPX4 rating;

238 For panel heater with towel rail hangers ensure:
- two fixed non heated towel hangers;
- has comfortable radiant heat output;
- has electronic thermostat accurate to within 0.1degree C;
- has user selectable comfort, background and frost protection settings;
- is splash proof to IPX4 rating;
- can be linked to a central control programmer by either pilot wire or mains bourne signals;
- is wall mountable; and
- has secure wall fixings;

Heated Towel Rail

239 For heated towel rail ensure:
- is oil filled tubular;
- has chromium plated finish
- has mains neon indicator;
- is splash proof to IPX5 rating
- can be linked to a central control programmer by either pilot wire or mains wire signals;
- is wall mountable; and
- has secure wall fixings;

Central Programmer

240 For central programmer ensure it is:
- wall mounted;
- has pilot wire or mains wire powered;
- has four zones, each with separate customisable user programme for each day of the week;
- has installer option to allow switching between comfort/set back modes, comfort/off modes or comfort/frost modes;
- manual programme over-ride facility with automatic return to programme at next timed change;
- mains wire signalling option has receiver cassettes on each heater; and
- has interface unit to control ancillary appliances or hot water;

Fixing electrical accessories/equipment

241 Position accessories accurately and squarely to the vertical and horizontal axes. Where not shown otherwise, align adjacent accessories on the same vertical or horizontal axis (as appropriate). Mounting heights to comply to current Building Regulations.

WORKMANSHIP

Installation generally

242 Install, test and commission the electrical work in accordance with the applicable Standards for electrical installations and the design and performance requirements set out in this section so as to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.

243 Ensure all installation Works are carried out by qualified electricians fully conversant with applicable Standards for electrical isntallations.

© Rand Associates Consultancy Services Ltd

244 Do not allow the number of Apprentices and Trainees at a Property to exceed the number of qualified electricians.

245 Ensure all installation Works are carried out to good workmanship by skilled (electrical) or instructed (electrical) persons and proper Materials shall be used in the electrical installation.

246 Use only the types of fastenings, bushes, glands, terminals, connectors, clips, clamps and all other minor accessories necessary to complete the installation that are recommended by the manufacturer of the electrical equipment being installed.

247 Avoid contact between dissimilar metals. Use corrosion resistant fastenings in locations where moisture is present or may occur.

248 The Provider must rectify, free of charge to the Contract, any Work which in the opinion of the Client's Representative has not been properly executed and must replace free of charge to the Contract any Materials which do not comply with the Specification.

249 The Provider must confirm the voltage and frequency of the supply before ordering any equipment. This will normally be 240v a.c. 50 Hz single phase.

250 The Provider must include in his tender for the provision of all fixings and the making good by qualified tradesmen to the satisfaction of the Client all damage to walls, ceilings, decorations and fitments.

251 Dust sheets are to be used and every consideration given to Customers property.

252 After Work is completed each day all systems will be left in a safe usable condition and all dust and mess cleared up.

Distribution charts - labelling of equipment

253 Fix circuit charts securely to the inside of each item of distribution equipment, clearly indicating the circuits protected, fuse and RCBO ratings and the size and type required.

Electricity supply

254 Note that the electricity supply is nominally 240 volt, single phase, 50 hertz, 2 wire.

System of wiring

255 For concealed wiring, use PVC insulated and sheathed cable of the size and type specified. Wherever possible, run it in below floors and ceiling voids.

256 Run cables along the sides of joists at the mid-point. Clip them at 450mm centres using cable clips of tinned brass secured by nonferrous fixing pins, screws, clips or a similar fixing. Support the wire and equipment located between the joists by a wood bearer of a size of at least 100x25mm.

257 Install the cable:
- with a minimum clearance of 150mm to all heating, gas and waste pipes or ducts; and
- physically separated from other wiring not associated with lighting and power supplies.

258 Where cables cross flooring joists they must be passed through small holes drilled through the centre of the joists. These holes must not exceed 25mm diameter.

259 Ensure cables leaving or crossing joists do so at right angles to the longitudinal side of the joist, on trusses or binders. Do not notch or saw joints. Ensure that cables do not run in positions where they are susceptible to damage by floor nails.

260 Do not run cables in roof spaces on the top of joists or near water tanks, etc., since in this position they are susceptible to damage.

© Rand Associates Consultancy Services Ltd

261 Install cables leaving roof voids and below floors or passing through any part of the structure in conduit or trunking as specified.

262 Ensure cables in solid floor that are either laid in screed or in a ceiling void are drawn in through rigid PVC-u conduit as specified and run continuously from the consumer unit to the outlet served.

263 Do not install cables within wall cavities.
264 Contain all wiring to each flat within that flat.

265 Fit conduits complete and then draw the cable through.

Cables installed in plastered walls

266 Protect cables by rigid PVC-u metric super high impact heavy gauge conduit where no conduit exists at present. Reuse existing conduit where approved by the Client's Representative.

267 Ensure new conduits are in continuous lengths, smooth in bore, true in size, and terminating in roof and below floors with a minimum projection of 50mm. Provide inside outlet boxes with a universal cleat.

268 Ensure new conduits are vertical and chased into the wall, such that the finished wall will provide a minimum of 10mm plaster cover. Adequately fix the conduit with sheradised nails and saddle clips, such that during the plastering processes, there is no tendency for plaster to push the conduit forward and reduce the cover.

269 Where approved by the Client's Representative, embed cables in plastered surfaces and cover them with 'top hat' trunking secured at a depth to allow the plastered surface to be made good.

Cables installed in proprietary de-mountable or plasterboard partitions

270 Install cables in proprietary or de-mountable similar type partitions. Draw them through holes formed by forcing a suitable rod through the honeycomb core of the partition from above.

271 Take due account of any insulation within the partition when sizing the cables so as to prevent overheating.

272 In plasterboard partitions with a timber core, draw cables through the partition between the timber studding and noggins. Where timber work occurs, take the cable over the face of the timber by a small chase through the plasterboard and into the timber. Make good the chase with a suitable plaster material finished smooth and flush. Ensure cables installed in partitions are vertical.

Conduit installed on the surface

273 Use super high impact light gauge PVC-u metric rigid conduit and accessories on fairfaced brickwork or unplastered surfaces in heating cupboards, stores, garages, plant rooms, meter compartments and similar areas.

274 Support the conduit by PVC-u spacer bar saddles and wood screws and rawlplugs at intervals not exceeding 400mm.

275 Allow for the expansion of PVC-u conduit.

276 Install the conduit only vertically or horizontally.

Where new cables are to be installed in or under solid floors

077 Protect cables by rigid PVC-u round super high impact heavy gauge conduit laid in continuous lengths from the consumer unit to the outlet served, run in a diagonal line. Use the proper outlet and inspection bends and tees. Adequately fix the whole system to avoid any displacement by subsequent building trades.

Requirements for PVC-u conduit systems

278 Install no more cables in each circular conduit than necessary to permit easy insertion and withdrawal. Do not install more than the maximum recommended in the applicable Standards.

© Rand Associates Consultancy Services Ltd

Demonstrate to the Client's Representative that cables can be easily withdrawn and inserted in any section of the installation. If this cannot be done using the existing conduit, then provide new conduit.

279 Use conduits, boxes, fittings and accessories from the same manufacturer and with suitable fixings for the application. Ensure circular conduit is at least 20mm in diameter.

280 Ensure metal outlet boxes and equipment do not become distorted during plastering. Install boxes flush with the finished plaster and the sides vertical, using 1.25" No.8 woodscrews and rawlplugs or equivalent fixing.

Use of cable trunking

281 Use cable trunking to improve the appearance at points in the installation where a number of conduits terminate or share a common route, and/or at the meter intake positions for the formation of distribution board/local isolator assemblies. Use compact miniature trunking of the appropriate size.

282 Use PVC-u trunking with fitted end covers. Provide a separate earth continuity conductor.

283 Connect trunking to equipment by appropriate screwed couplers, bushes and shakeproof washers, or flanged couplings.

284 Connect trunking to PVC-u conduit by "threaded to plain" adaptors with lock nuts, or clip in adaptors.

285 Clean out trunking before cable is drawn in.

286 Ensure the number of cables installed in trunking does not exceed the space factor specified in applicable Standards.

Conductors

287 Ensure all cables comply with British Cable Association recommendations (or equivalent).

288 Carefully remove any insulation in making terminations without causing damage to the conductor. Double the wiring to fill the terminations.

289 Take the sheath of PVC sheathed cable inside the outlet boxes or the pattress of ceiling fittings and similar equipment.

290 Securely clamp flexible cords and fit suitable grommets to all terminal boxes.

291 Use cables of the following types and sizes complete with integral earth continuity:

Concealed wiring - copper 2 core and earth PVC insulated and sheathed	
Electric Heating	- 2.5mm sq
Shower circuit	- 10.00mm sq
2/3 Kw Immersion Heater	- 2.5mm sq
3 Kw Water Heater	- 2.5mm sq

16 amp heating circuit installation

292 Connect storage heaters in dedicated radial circuits without spurs using cable as specified, with both ends of each circuit terminated in one 16 amp RCBO at the consumer distribution unit.

293 A radial circuit may supply two storage appliances subject to the circuit protective device not exceeding 20amps.

294 Prevent overloading of circuits by providing specified appliances with separate final-circuits.

295 Use junction boxes only with the approval of the Client's Representative.

296 Locate fused connector boxes in the same positions as those existing.

© Rand Associates Consultancy Services Ltd

297 Ensure the positions of fused switched connection units relative to the floor level are as follows:

Location	**Dimensions from centre line of socket to floor level**
General living areas, hall, landings, etc.	450mm – 1200mm
Elderly persons' Properties	450mm - 1000mm
Bedrooms (except elderly persons' Properties)	450mm – 1200mm

298 Recess back boxes into the walls to just below plaster level and provide them with adjustable fixing lugs.

Immersion heaters

299 For immersion heater circuits, provide one final sub-circuit connected to one 16 amp RCBO at the consumer distribution unit using cable as specified.

300 Provide for the heater to be controlled by a heating booster switch located above worktop in kitchen.

301 Use flush fitting units where switches are located outside the airing cupboard. Where switches are located inside the airing cupboard, use either surface or flush fitted units.

302 Terminate the circuit adjacent to the heater using suitable cable and a flex outlet plate. Make the final connection with heat resistant flexible cable as specified and run so as to prevent the hanging of clothes, etc., on the cable. When control switches are remote from the heaters, provide an appropriate means of isolation.

303 When the supply cable is exposed within an airing cupboard, protect cables with mini-trunking as specified.

Showers

304 For shower circuit, provide one final sub-circuit connected to one 45amp RCBO at the consumer distribution unit using cable as specified.

305 Provide for the shower to be controlled as near as practicable to the shower unit, by either a white 20amp AC, DP neon indicating pull switch with pull cord if located in bathroom, and by a white 20amp AC DP neon indicating switch labelled "shower".

Installation control and distribution

306 Install the consumer control and distribution unit for UNRESTRICTED supplies in each Property. Ensure the exact form and position of the equipment is as specified in the Order or Instructed by the Client's Representative. This may consist of either:
- a purpose made wall mounting cabinet with external meter reading access; or
- a non-combustible consumer unit located within a meter cupboard.

307 Ensure the consumer equipment consists of a non-combustible unit complying with applicable Standards complete with:
- double pole AC main switch of a rating suited to the loading/diversity of the installation;
- sufficient RCBO's to accommodate all the sub-circuits scheduled for the Property; and
- a minimum of 20% spare ways;

308 Ensure sufficient space is available for the Utility Provider's metering and service cut outs. If required, provide a panel which satisfies the requirements of the Utility Provider for mounting meters, cut out and other equipment.

© Rand Associates Consultancy Services Ltd

309 Supply and install PVC-u connection tails to the Utility Provider's point of supply, using correct coding and matching the cross sectional area to the main isolating switch rating.

310 Upgrade all earth and bonding to conform to the applicable Standards for electrical installations. Do not use metal trunking as an earth conductor.

311 Use PVC-u cable trunking to enclose meter tails as specified.

312 Provide equipment in a colour approved by the Client's Representative.

313 Clearly identify each way used for distribution equipment.

314 Ensure the mounting height of equipment is such that persons of average height can reach all fuses, switchgear, etc., from floor level without assistance.

315 Conceal cables above the ceilings and maintain access to the cable runs.

316 Enclose cables run in cupboards in mini-trunking.

317 Before and on starting the Works, obtain approval from the Client's Representative to the proposed routes of cable runs and wiring circuits.

318 Agree any alterations to the agreed routes of wiring circuits with the Client's Representative before starting the Works on them.

319 If Works are carried out before having agreed the routes with the Client's Representative, return and reroute and rewire cable runs and circuits where Instructed by the Client's Representative.

Standardisation of components

320 Use matching components with all fused spurs and similar equipment used in the Works, being from the same manufacturer.

Removal of floor boarding, etc

321 Carefully remove any floor boarding necessary for the installation of cables. Saw through the tongues only and replace the boards in a workmanlike manner. Ensure any new floor boarding is identical in width and thickness. Remove all debris from the joist and roof spaces.

322 Make good all plaster disturbed by the removal of fittings to a true and level surface.

323 Do not disfigure timber frames and mouldings by sawing or chiselling out for the insertion of cables.

324 Where the removal of mouldings, etc. is necessary, ensure the replacement is carried out by a qualified tradesman and that the replacement surface matches the existing surface.

Existing roof insulation

325 Where the roof insulation must be moved for the electrical installation, carefully move it to one side. On completion of the electrical Works carefully replace it to its original position. Take care not to cover lengths of cable with insulating material to ensure the current rating of the cable(s) is not unduly altered.

Removal of old cables and fittings

326 Remove old cables and redundant switches, sockets, clips, boxes, etc. from roof spaces, exposed walls and other noticeable places and make good any disturbed surfaces

© Rand Associates Consultancy Services Ltd

COMPLETION

Inspection and testing

327 Ensure that on completion and before being energised, any installation is tested in accordance with the applicable Standards for electrical installations.

328 Give not less than 24 hours-notice to the Client's Representative before commencing the testing.

329 After satisfactory completion of tests, submit electronically a copy of all inspection and completion certificates, with all associated schedules and test results where applicable, to the Client's IT system.

330 Note the testing instrument serial numbers on the test certificates.

331 All charges for testing or re-testing must be borne by the Provider.

332 The Provider must provide all the test instruments and test equipment required, make all arrangements for connections of the mains supply and issue to local authority supply company all appropriate test notices.

Report and certificates

333 Ensure all inspections, reports and test certificates and forms are the latest version and are in the standard format published by the IET for Electrical Installation Certificates approved by the Client's Representative.

334 Upload unto the Client's IT System an Electrical Installation Completion Certificate for Major Works or alterations to electrical installations which involve:
- a change or modification to two or more existing circuits;
- the addition of one or more new circuits to an existing installation; or
- a new installation.

335 Provide an electrical installations condition report when specifically Instructed by the Client's Representative.

336 Documentation

Manufacturers Operating and Maintenance Instructions: The Client's Representative and Customer shall be given sufficient information for the equipment installed, including all operational and maintenance instructions, controls and any other details so the Property can be operated and maintained in an energy efficient manner as to use no more power than is reasonable in the circumstances. The instructions shall be directed to the specific equipment in the Property and shall be readily understandable by the Customer.

System Operating Instructions: Without comprising Health & Safety requirements, the instructions should explain to the Customer of the Property how to operate the electrical Storage and Panel Heaters efficiently including how to make adjustments to the timing and temperature controls of equipment.

Notice: The Provider shall notify in writing to the Local Building Authority and Client's Representative that all fixed building services have been properly commissioned, not more than 5days after completion of the commissioning work.

337 CIRCUIT CHART

Standard: To applicable Standard
Requirement: A legible circuit chart/schedule shall be provide indicating in particular the information required in Regulation 514.9.1
Schedule: A laminated durable copy of the circuit chart/schedule relating to each consumer unit shall be provided within or adjacent to each Consumer Unit and to be securely fixed.

© Rand Associates Consultancy Services Ltd

Client's current manufacturers/suppliers/products

338C Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand Name	Manufacturer's Details
Please refer to table within ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) section.		

© Rand Associates Consultancy Services Ltd

SMOKE, HEAT AND CARBON MONOXIDE DETECTORS

OPTICAL SMOKE ALARM TECHNICAL SPECIFICATION

001 The Optical Smoke Alarm shall have the following features:

- The Smoke Alarm shall carry the BSI Kitemark to indicate type testing to applicable Standard. It will meet the requirements of Grade D (and exceed the requirements of Grades E and F) as defined in the applicable Standards. It carries the CE mark to indicate conformance to Low Voltage and Electromagnetic Compatibility Directives.
- The alarm shall have an optical (photoelectric) sensor with large volume chamber and large high sensitivity photodiode. The sensor chamber shall have an insect resistant fine mesh screen with holes less than 0.030 inches.
- The alarm shall operate on a 230V AC Mains Power Supply with built-in tamper proof Rechargeable Vanadium Pentoxide Lithium standby cells, capable of lasting at least 10 years and powering the alarm initially for at least 6 months in the event of mains power failure.
- The Lithium cell manufacturer shall endorse a minimum 10-year life expectation for the rechargeable cells.
- The alarm shall be supplied with a built-in surface mounting plate, with integral terminal block and cable cover and incorporate a foam gasket fitted to the mounting plate to prevent dust ingress into the unit. The alarm shall connect to the mains and interconnect/control connections automatically as it slides on to the mounting plate. The alarm shall disconnect from the mains and interconnect/control connections as it slides off the mounting plate, without the need for a lead and connector.
- All mains wiring shall be covered by a cable cover so that the mains cable is not visible when the Smoke Alarm is removed from the ceiling, obviating the need for a ceiling pattress or dry lining box.
- The alarm shall have a built-in sounder giving a minimum sound output of 85dB(A) at 3 metres. The diameter of the piezo disc in the sounder shall measure 35mm and have wire contacts soldered directly on to the piezo disc.
- There shall be an interconnection capability so that if one alarm sounds all interconnected alarms sound.
- A remote test facility via a separate Remote Control Switch shall be available to test circuitry, sensor and horn (red LED shall flash rapidly) and to activate all interconnected alarms in the system. The Remote Control Switch shall also have a remote 'Locate' facility (to audibly identify the source of an alarm signal when the system is sounding). All units except the alarm that has triggered and sent out the interconnect signal shall be silenced when this switch is activated. The Remote Control Switch shall also have a 'Silence' facility for false alarm control. Pressing and resetting the 'Silence' switch shall silence nuisance alarms. A red LED on the alarm cover shall flash every 10 seconds to indicate that alarm is in 'Hush' mode and automatically reset in approximately 10 minutes.
- The alarm shall have an automatic self-test feature which tests the chamber every 40 seconds and the unit bleeps (without red LED flash) if it is degraded.
- The alarm shall be provided with a manual integral test/hush button to test circuitry, sensor and horn and activate all interconnected alarms in the system. This button shall also operate a 'Hush' feature to silence nuisance alarms. A red LED shall flash every 10 seconds to indicate that alarm is in 'hush' mode and shall automatically reset after approximately 10 minutes.
- The alarm shall have a separate green LED mains indicator light to confirm integrity of mains power supply.
- The alarm shall have a separate red LED which will flash every 40 seconds to indicate full auto test of circuitry and the rechargeable cells. The red LED shall flash rapidly in alarm condition and flash once every ten seconds whilst the unit is in a de-sensitive (hush) condition.
- The alarm shall have an RF (Radio Frequency) wireless interconnect capability when used with an RF base. In this case other RF products can be connected.
- Control via an optional wall-mounted Hardwired or RF Remote Control Switch shall also be available.
- The alarm shall have a low power cell-warning signal, which must operate with or without mains power present.
- The alarm shall be provided with an anti-tamper locking device to prevent unauthorised removal of the alarm without the use of a tool.
- The alarm shall be supplied with a dust cover fitted to protect it from contamination during installation.
- The alarm shall be supplied with two separate sets of instructions - one for the installer and one for the user.
- The alarm shall have a 5 Year guarantee.

© Rand Associates Consultancy Services Ltd

HEAT ALARM TECHNICAL SPECIFICATION

002 The Heat Alarm shall have the following features:

- The Heat Alarm shall carry the BSI Kitemark to indicate type testing to applicable Standard for a Class A1 device. It shall be CE marked to indicate conformance to applicable Standard Low Voltage, and applicable Standards Electromagnetic Compatibility Directives.
- The alarm shall be of the fixed temperature thermistor type, temperature range 54^0C to 62^0C (129^0F - 144^0F).
- The alarm shall operate on a 230V AC Mains Power Supply and have built-in tamper proof Rechargeable standby cells, capable of lasting at least 10 years and powering the alarm initially for at least 6 months in the event of mains power failure.
- The rechargeable cell manufacturer shall endorse a minimum 10 year life expectation for the rechargeable cells.
- The alarm shall be supplied with a built-in surface mounting plate, with integral terminal block and cable cover and incorporate a foam gasket fitted to the mounting plate to prevent dust ingress into the unit. The alarm shall connect to the mains and interconnect/control connections automatically as it slides on to the mounting plate. The alarm shall disconnect from the mains and interconnect/control connections as it slides off the mounting plate, without the need for a lead and connector.
- All mains wiring shall be covered by a cable cover so that the mains cable is not visible when the alarm is removed from the ceiling, obviating the need for a ceiling pattress or dry lining box.
- The alarm shall have a built-in sounder giving a minimum sound output of 85dB(A) at 3 metres. The diameter of the piezo disc in the sounder shall measure 35mm and have wire contacts soldered directly on to the piezo disc.
- There shall be an interconnection capability so that if one alarm sounds all interconnected alarms sound.
- A remote test facility via a separate Remote Control Switch shall be available to test circuitry, sensor and horn (red LED shall flash rapidly) and to activate all interconnected alarms in the system. The Remote Control Switch shall also have a remote 'Locate' facility (to audibly identify the source of an alarm signal when the system is sounding). All units except the alarm that has triggered and sent out the interconnect signal shall be silenced when this switch is activated. The Remote Control Switch shall also have a 'Silence' facility for false alarm control. Pressing and resetting the 'Silence' switch shall silence nuisance alarms. A red LED on the alarm cover shall flash every 10 seconds to indicate that alarm is in 'Hush' mode and automatically reset in approximately 10 minutes.
- The alarm shall be provided with a manual integral test/hush button to test circuitry, sensor and horn and activate all interconnected alarms in the system. This button shall also operate a 'Hush' feature to silence nuisance alarms. A red LED shall flash every 10 seconds to indicate that alarm is in 'hush' mode and shall automatically reset after approximately 10 minutes.
- The alarm shall have a separate green LED mains indicator light to confirm integrity of mains power supply.
- The alarm shall have a separate red LED which shall flash every 40 seconds to indicate full auto test of circuitry and the rechargeable cells. The red LED shall flash rapidly in alarm condition and flash once every ten seconds whilst the unit is in a de-sensitive (hush) condition.
- The alarm shall have an RF (Radio Frequency) wireless interconnect capability when used with an RF base. In this case other RF products can be connected.
- Control via an optional wall-mounted Hardwired or RF Remote Control Switch shall also be available.
- The alarm shall have a low power cell-warning signal, which must operate with or without mains power present.
- The alarm shall be provided with an anti-tamper locking device to prevent unauthorised removal of the alarm without the use of a tool.
- The alarm shall be supplied with a dust cover fitted to protect it from contamination during installation.
- The alarm shall be supplied with two separate sets of instructions - one for the installer and one for the user.
- The alarm shall have a 5 year guarantee.

© Rand Associates Consultancy Services Ltd

MAINS POWERED CARBON MONOXIDE (CO) ALARM

003 The Mains Powered Carbon Monoxide Alarm shall have the following features:

- The CO Alarm shall carry the BSI Kitemark to indicate type testing to applicable Standard. It shall be CE marked to indicate conformance to Low Voltage and Electromagnetic Compatibility Directives.
- The alarm shall have a new generation electrochemical cell type carbon monoxide sensor which checks CO level every 70 seconds. Each unit shall be calibrated and tested in CO gas to ensure accuracy. The sensor module should plug into base of unit and should be replaced after 5 years. The amber 'Fault' light should flash once every 40 seconds (without a beep) to indicate the sensor should be replaced. Replacement sensor modules shall be readily available at modest cost. It shall not require an electrician to change the sensor.
- The alarm shall have a high level of selectivity - no false alarms when exposed to the following interference gases for 2 hours: (as per UL2034sec.38) Methane 500ppm, Butane 300ppm, Heptane 500ppm, Ethyl Acetate 200ppm, Isopropyl Alcohol 200ppm and Carbon Dioxide 1000ppm.
- The alarm shall be 220 – 240V AC, 50 Hz mains powered. Power consumption shall be: 1 Watt, 60mA. The alarm shall be supplied complete with sealed-in tamper proof Panasonic Rechargeable Vanadium Pentoxide Lithium standby cells, designed to last at least 10 years without the need for replacement and can power the unit for a minimum 30 days in the event of mains failure. The rechargeable cells shall be monitored and if they start to be depleted (i.e. with mains off) or if they become defective the unit should beep every 40 seconds. The cell manufacturer shall endorse a minimum 10 yr life expectation for the rechargeable cells.
- The alarm shall be supplied with a surface mounting plate, with integral terminal block, cable cover and incorporate a foam gasket fitted to the mounting plate to prevent dust ingress into the unit. The terminal block shall be permanently fitted to the mounting plate. The built-in rechargeable cells shall connect as the alarm is slid on to the mounting plate. There shall be an option for conduit (up to 25 x 16mm) to be attached to the top or bottom of the unit for surface wiring. The unit shall be able to be ceiling or wall mounted.
- The alarm shall have a hard-wire interconnect capability such that if one alarm sounds all interconnected alarms sound. Additionally, an RF interconnect option shall be available when used with an Interface Module.
- A remote test facility via a separate Remote Control Switch shall be available to test circuitry, sensor and horn (red LED shall flash rapidly) and to activate all interconnected alarms in the system. The Remote Control Switch shall also have a remote 'Locate' facility (to audibly identify the source of an alarm signal when the system is sounding. All units except the alarm that has triggered and sent out the interconnect signal shall be silenced when this switch is activated. The Remote Control Switch shall also have a 'Silence' facility for false alarm control. Pressing and resetting the 'Silence' switch shall silence nuisance alarms. A red LED on the alarm cover shall flash every 10 seconds to indicate that alarm is in 'Hush' mode and automatically reset in approximately 10 minutes.
- On first power up the Red and Amber LED's shall flash once; after 2 minutes settling, the unit shall operate normally.
- The alarm shall have a green LED indicator light that confirms integrity of mains power supply.
- The alarm shall have low and high level indicators - red LED indicator light shall flash every 2 seconds at 50ppm CO (sounder operate within 60-90 mins); flash twice every second at 100ppm CO (sounder operate within 10-40 mins); flash 4 times per second at 350ppm CO (sounder operate within 3 minutes)
- The alarm shall have a fault indicator - amber LED flash and horn beep every 40 seconds if a fault is detected.
- The alarm shall have a manual test/hush button - test button to test circuitry and horn. Pressing and releasing the test button when the unit is sensing CO shall silence the alarm for 4 minutes. It must only silence once until the gas clears. At 300ppm CO the unit shall not silence due to the increased danger.
- The alarm shall have a quick CO Gas Test to reduce the time for testing with CO from at least 4 - 5 minutes to less than 10 seconds.
- The alarm shall have a memory feature - pressing test button must record if CO has been detected during a period of absence: red LED off – no CO recorded; red LED flashes twice (every 40 seconds) – 50ppm CO recorded; red LED flashes 4 times (every 40 seconds) –100ppm; red LED flashes 8 times (every 40 seconds) - 300ppm CO recorded. Pressing the test button for 20 seconds must reset the memory.

© Rand Associates Consultancy Services Ltd

- The alarm shall have a built in sounder to give a minimum output of 85dB(A) at 3 metres. The sound output shall be modulated - 3 rapid pulses followed by a 1½ second pause, repeated until reset. This easily differentiates it from a typical smoke alarm.
- The alarm shall have an automatic reset facility of alarm test when button is released and after an alarm state when CO gas clears.
- The alarm shall have a tamper resistant cover, which cannot be removed from mounting plate without releasing catch with a small screwdriver. There shall be an optional locking screw that can be screwed into the side to prevent removal. The rechargeable cells must not be suitable for use with other products and must be soldered on to the circuit board.
- The alarm shall have an operating temperature range: -10°C to +40°C (14°F - 104°F). 15% to 95% relative humidity (non-condensing).
- The alarm shall have a 5 Year Guarantee.

Client's current manufacturers/suppliers/products

004 Ensure all Materials are compatible with and standardised to the Client's current products specified in the table below (listed by manufacturers, suppliers and/or brand names).

Product	Brand Name	Manufacturer's Details
Please refer to table within ELECTRICAL INSTALLATIONS (WHOLE DWELLING REWIRES) section.		

© Rand Associates Consultancy Services Ltd