Electrical Services Standard Specification
3.0 - Conduit and Cable Trunking Installations

May 2010

For
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UNIVERSITY OF LONDON
## AMENDMENTS

<table>
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<tr>
<th>Author</th>
<th>Date/Rev</th>
<th>Description</th>
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<tr>
<td>Peter Calderon</td>
<td>January 2010</td>
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<tr>
<td>Anthony Miller</td>
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3.1 INTRODUCTION

This specification relates to the requirements for the supply and installation of conduit and cable trunking systems.

The appropriate British Standards should be complied with at all times, particular attention shall be paid to BS7671 : 2008 and its subsequent amendments.

The use and application of material covered in this specification shall be in accordance with the requirements of Royal Holloway University of London.

ALL WORKS ARE TO BE INSPECTED BY THE TENDERING CONTRACTOR PRIOR TO PRICING

HEALTH AND SAFETY STATEMENT

Health and Safety precautions are required to be taken during the process of undertaking works within buildings cannot be underestimated.

Reference shall be made to Royal Holloway University Health and Safety Policy and Contractors Guidance documents available from Royal Holloway University of London Estates Office.

The Health and Safety Executive (HSE) publish a series of guidance documents regarding different methods of protecting the workforce and people in general when undertaking potentially dangerous work activities.

Installers engaged in any work shall be registered with the Construction Skills Certificate Scheme (CSCS) and be in possession of a valid skills card.
3.2 CONDUIT AND CABLE TRUNKING INSTALLATION

3.2.1 Nature and Extent of Work
The works to be undertaken in this section covers the supply, delivery, off-loading, storing, erection, installation, testing and setting to work of all conduit and cable trunking required, including all fixings and brackets, as detailed on the drawings.

3.2.2 Segregation of Services
Independent conduit, trunking and tray systems shall be provided for:

(i) Lighting and Power (LV)
(ii) Fire Alarm Systems
(iii) Telephone and Data Systems
(iv) CCTV & Security
(v) Controls wiring

3.2.3 Conduit Installation, Generally
All metallic conduits shall be:

(a) Installed neatly and as unobtrusively as possible, parallel to general building lines when run on the surface of walls and ceilings.

(b) Routed as agreed by Royal Holloway University of London before installation. Spaced at the standard dimensions of multiple saddles where two or more conduits are run together.

(c) Checked for rigidity and mechanical damage where run in floor screed, before the floor screed is laid. Any damaged conduit runs shall be renewed.

(d) Laid in straight line from point to point when concealed.

(e) Protected at terminations by plugs or caps until installation of cables and swabbed dry and proved clear before wiring commences.

(f) Provided with temporary protection where run in floors to prevent damage to the finish, until floor screeds are laid.

(g) Painted with rust inhibiting paint after erection where threads are exposed or where the finish is damaged.

(h) Screwed and butted solidly into boxes, couplings and conduit fittings and satisfactorily mechanically continuous throughout.

(i) Tested for satisfactory electrical continuity before plastering or screeding and before cables are drawn in.

(j) Installed with the minimum of running couplings other than those provided under (o) below. Where provided, couplings shall have machined end faces for locknuts having machined faces.
(k) Bent or set using a bending machine and with minimal deformation of bore.

(l) Threaded parallel with the bore. All conduit shall be held in an efficient pipe vice for screwing. Where coupled to equipment or trunking not having tapped conduit entries, smooth bore male brass bushes shall be used inside the equipment and circular milled locknuts to be installed at all terminations and on each side to ensure electrical continuity.

All bushes shall be fitted with spring, shakeproof or compression washers.

(m) Installed in accordance with the 17th Edition of the IEE Regulations BS.7671 with respect to the maximum allowable number of cables in conduits.

(n) Provided with draw-in facilities for easy installation or withdrawal of any one or all cables.

(o) Installed with a running coupler socket inserted within 300mm above the floor or below the ceiling on all vertical drops or risers.

(p) Installed only vertically in wall chases or on the surface of the walls. Horizontal runs shall be avoided where possible and only provided following Royal Holloway University of London agreement.

(q) Supported 300mm each side of any bend, set adaptable or draw-in box. Conduit boxes shall be fixed to the fabric of the building independently of the conduit; where the conduit boxes have a minimum degree of protection of IP44 the fixings shall not reduce that protection.

(r) Installed using spacer bar saddles for surface runs exposed to view.

(s) Installed using pressed steel or spacer bar saddles, or approved proprietary fixing when installed in roof spaces, above suspended ceilings, or in other spaces as agreed with the Services Engineer.

(t) Installed using crampets for fixing when installed in screeds or in chases which will be rendered and plastered.

(u) Installed with saddles or crampets spaced at maximum distances of:

<table>
<thead>
<tr>
<th>Conduit Size</th>
<th>Vertical Spacing</th>
<th>Horizontal Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>20mm - 25mm</td>
<td>1.2m</td>
<td>0.9m</td>
</tr>
<tr>
<td>32mm - 40mm</td>
<td>1.5m</td>
<td>1.2m</td>
</tr>
<tr>
<td>50mm</td>
<td>1.8m</td>
<td>1.5m</td>
</tr>
</tbody>
</table>

(v) Installed with saddles rigidly fixed to the structure by means of proprietary make of wall plug and screws to a depth to suit the structure.

(w) Installed with all fixing holes in walls etc. drilled with masonry drills.
(x) Installed so that where condensation in the conduit is likely, the sections shall be isolated by means of a conduit box filled with plastic compound of the non-hardening type, located in the higher position in the conduit run.

(y) Provided with adequate drainage points where condensation is likely to occur.

(z) Of 20mm dia. minimum.

(aa) If the protective finish of any materials has been damaged, those materials shall either not be used or any remedial work shall be agreed by Royal Holloway University of London before use. Conduits shall be clean and free from oil.

(bb) Where a terminal block is to be accommodated in a circular conduit box, an extension ring shall be fitted to the box, of sufficient depth to ensure adequate space for the terminal block and cables.

(cc) The length of thread on the ends of steel conduit shall match that in the conduit fittings or equipment; exposed thread will not be permitted.

Running couplings with backnuts may be used with conduit having Class 2 protection, but where the protection is Class 4 only manufactured running joints will be accepted. Exposed thread on running couplings shall be given a coat of zinc-rich paint.

(dd) Conduit shall be cold bent on site with a suitable bending tool, without deforming its cross section.

(ee) Unless otherwise agreed, conduit buried in concrete shall have at least 30mm depth of cover and shall be galvanised; it shall be securely fixed to prevent movement during pouring and vibrating of the concrete. Conduit buried in plaster shall have at least 5mm depth of cover.

(ff) Where conduits, cross expansion and settlement joints in the building structure suitable provision shall be made to allow for movement of the structure. The Installer shall submit his proposals for the approval of Royal Holloway University of London.

(gg) Where conduit passes through an external wall a conduit box shall be fitted on the inside of the wall and, after wiring, filled with an inert, permanently plastic compound having a high insulation value.

(hh) Conduit shall be installed in screeds only where indicated or after receipt of the Royal Holloway University of London's approval. Conduit boxes in floors, other than for agreed outlets, will not be permitted.

(ii) Open ends of conduit shall be temporarily plugged immediately after they are installed to prevent ingress of water and solid material.

Conduit Installations shall NOT:

(a) Be concealed before inspection and agreed by the Royal Holloway University of London.
(b) Have more than two right angle bends in any run without the provision or a draw-in box.

(c) Have runs or more than 10m without a draw-in box on straight lengths or 7.5m on lengths containing a bend or bends.

(d) Incorporate manufactured bends, tees, or elbows unless specified or with the prior permission of Royal Holloway University of London. Circular junction or adaptable boxes may be used instead.

(e) Be fixed by means of crampets on the surface of walls.

(f) Have cables drawn in until erection is completed.

(g) Be dismantled for cabling.

(h) Be scored, marked or have the bore deformed.

(i) Have damaged or poorly cut threads.

(j) Be installed in contact with steam water or gas or heating pipework. A distance of 150mm shall be maintained from all other services wherever possible.

(k) Have any untreated rust patches on surface.

**Galvanised Conduits shall be:**

(a) Fixed using galvanised saddles and sheradised or galvanised screws.

(b) Painted with zinc rich paint where threads are exposed.

(c) Installed with all necessary galvanised accessories.

(d) Galvanised conduits shall be installed where conduits are installed in floor screeds, and where surface installation is required.

### 3.2.4 Steel Conduits Generally

**Conduits shall be:**

(a) Class 2, black enamel inside and outside welded conduit to BS.4568 Part 1, and BSEN.50086 where applicable for screwed conduit installation. Class 4, hot dipped galvanised inside and outside welded conduit to BS.4568 Part 1, BSEN50086 where applicable and screwed for conduit installation.

(b) Class 2 for general use in flush installations internally and Class 4 for use in surface installation, in Plant Rooms/Switch Rooms, floor trenches and in floor screeds. Class 4 conduits shall be hot galvanised inside and out during manufacture.

(c) Threaded to the correct length in accordance with BS.4568 and each length shall be reamed at both ends to remove all sharp edges and burrs after screwing.

(d) Cleaned of all lubricants and swarf before installation. Factory machined threads already cut shall be cleaned by having dies run over them and wiped clean.
Protected from weather and mechanical damage during storage and installation at site.

### 3.2.5 Conduit Fittings

Circular Conduit Boxes shall be:

(a) Of malleable cast iron to BS.4568 Part 2 finished Black enamel silverlac or galvanised as appropriate and provided with lids of mild steel malleable 2.4 thick sheet steel 1-15 thick for small type or malleable 3.2 thick, sheet steel 1-47 thick for large type, finished to suit the box and secured in position by brass roundhead or cheesehead screws.

(b) Provided with tapped spout entries except where arranged for back entry looping.

(c) Of heavily galvanised weatherproof Type IP44 where installed externally, with mineral jelly between surface of the joint, or alternatively fitted with a gasket.

(d) Of the tangent type at right angle changes or direction where necessary to form a neat and unobtrusive run.

(e) Installed in such a manner that the edge of the box is flush with the finished surface, or alternatively extension rings shall be used. Royal Holloway University of London shall be informed where extension rings are proposed, prior to installation.

(f) Firmly grouted in where provided for switch and socket outlet points in brick and concrete.

(g) **Conduit Fixings:**

1. Fixing of Conduit:

<table>
<thead>
<tr>
<th>Location</th>
<th>Type of fixing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor screeds</td>
<td>Saddles</td>
</tr>
<tr>
<td>Buried in plaster or render</td>
<td>Crampets or saddles</td>
</tr>
<tr>
<td>Above false ceilings</td>
<td>Spacer bar saddles</td>
</tr>
<tr>
<td>Surface</td>
<td>Distance saddles</td>
</tr>
</tbody>
</table>

2. Fixing of Saddles and Conduit Boxes:

<table>
<thead>
<tr>
<th>Building Fabric</th>
<th>Type of Fixing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural steelwork</td>
<td>Purpose made clamps, the type to be agreed by the Royal Holloway University of London</td>
</tr>
<tr>
<td>Non-structural steelwork</td>
<td>Set screws and nuts</td>
</tr>
<tr>
<td>Concrete, brick or building blocks</td>
<td>Fibreplugs and screws</td>
</tr>
<tr>
<td>Hollow blocks and pot floors</td>
<td>Butterfly spring toggle bolts or gravity bolts</td>
</tr>
<tr>
<td>Timber</td>
<td>Woodscrews</td>
</tr>
</tbody>
</table>
Adaptable boxes shall be:

(a) Manufacture from sheet steel or cast iron.
(b) Used instead of BS.4568 type boxes where two or more parallel conduit lengths are jointed together.
(c) Provided with earthed steel barriers where necessary to segregate services.
(d) Galvanised malleable cast iron type with heavy lids made watertight where used externally.
(e) Fitted with overlapping lids where used on flush installation.
(f) Heavily galvanised after manufacture, where used with galvanised conduit.
(g) Fixed in accessible positions and secured to the fabric of the building.
(h) Of adequate size for the number and size of cables entering and leaving and for the largest size of conduit connected to the box.

3.2.6 **Flexible Metallic Conduit**

Flexible Metallic Conduit shall be:

(a) Used only to items of equipment which are withdrawable or subject to vibration or adjustment.
(b) LSF sheathed and flame retardant, self extinguishing and of ample capacity for the number of cables.
(c) Have a minimum length of 300mm and have sufficient length to allow the full range of withdrawal, adjustment, or movement necessary.
(d) Terminated at each connection with factory made clamps. Run with earth conductors of minimum size 1.5mm² insulated cable installed externally, neatly taped to conduit and fixed at each end of the conduit with earth clamps.
(e) In accordance with BSEN.50086.
(f) All flexible metallic conduits shall be manufactured to the following standards:

<table>
<thead>
<tr>
<th>Conduit Types</th>
<th>Construction (Layers)</th>
<th>Temperature Range</th>
<th>Conduit Size Range (External Diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT-PVC Flexible</td>
<td>Galvanised steel core twine packed with black or grey PVC covering.</td>
<td>-25°C to +105°C</td>
<td>16-63mm</td>
</tr>
<tr>
<td>CSA Flexible</td>
<td>Galvanised steel core twine packed with black PVC covering.</td>
<td>CSA Rated + 75°C</td>
<td>16-63mm</td>
</tr>
<tr>
<td>UL Flexible</td>
<td>Galvanised steel core. Copper packed, grey PVC covering.</td>
<td>UL Rated -10°C to +60°C</td>
<td>16-63mm</td>
</tr>
<tr>
<td>RO-PVC Flexible</td>
<td>Galvanised steel core. Twine packed with special PVC (Grey) for extra resistance to oil.</td>
<td>-40°C to +105°C</td>
<td>16-63mm</td>
</tr>
<tr>
<td>LEF Flexible</td>
<td>Galvanised steel core. Twine packed, with black PVC covering.</td>
<td>-10°C to +70°C</td>
<td>16-40mm</td>
</tr>
</tbody>
</table>

(g) Electrical `flash' voltage shall be greater than 2kV.

(h) Insulation resistance shall be greater than 10MΩ.

(i) Manufactured in accordance with BSEN. 50086.

(j) All connectors shall comply with BSEN. 50086.

Metric threads shall comply with BSEN. 60423.

Metallic Flexible Conduit shall NOT be:

(a) Used externally to a building or exposed to the weather or in any position where ingress of moisture may occur.

3.2.7 Cable Trunking Installation

All cable trunking shall be:

(a) Installed neatly and as unobtrusively as possible, parallel to general building lines when run on the surface of walls and ceilings or where concealed in ceiling or other service voids.

(b) Routed as agreed by Royal Holloway University of London before installation.

(c) Checked for rigidity and mechanical damage where run in floor screed, before the floor screed is laid. Any damaged runs shall be renewed.
(d) Provided with temporary protection where run in floor to prevent damage to the finish, until floor screeds are laid.

(e) Butted solidly at intersections and joints between lengths, and satisfactorily mechanically continuous throughout. Earth links shall be provided for electrical continuity.

(f) Tested for satisfactory mechanical continuity before plastering or screeding and before cables are drawn in.

(g) Galvanised for all exposed/surface runs.

(h) Joined between lengths and at changes of direction using the manufacturer’s factory made accessories.

(i) Installed in accordance with the current edition of the IEE Regulations with respect to the maximum allowable number of cables in trunking.

(j) Installed with cable supports to all vertical drops or risers in accordance with the current edition of the IEE Regulations.

(k) Installed with fire barriers where runs pass through floors, fire division walls or smoke compartments.

(l) Supported 150mm each side of any bend or set.

(m) Installed clear of the structure utilising purpose made brackets.

(n) Installed on walls with fixings by means of proprietary make of wall plug and screws to a depth to suit the structure.

(o) Of the one manufacturer throughout for each type of trunking.

**Trunking Installation shall NOT:**

(a) Be concealed before inspection and approval by the Installer.

(b) Have cables drawn in prior to being complete.

(c) Be dismantled for cabling.

(d) Be scored, marked or otherwise deformed.

(e) Be installed in contact with steam water or gas or heating pipework. A distance of 150mm shall be maintained from all other services wherever possible.

**3.2.8 Standard Cable Trunking**

(a) The dimensions of cable trunking shall be determined by the Installer in accordance with requirements of the current edition of the IEE Regulations.

(b) The trunking shall be heavy gauge 16 swg 1.6mm type single or multi-compartment.
(c) Cables shall be retained in the trunking by the manufacturer’s retaining clips.

(d) Fixed or bracketed to the structure at intervals not exceeding 2 metres.

(e) The trunking shall have removable lid over its entire length which shall be fixed at 1 metre intervals.

Where the trunking passed through walls or floors, the lid shall be neatly cut 75mm on each side, to allow removal or adjacent lengths.

(f) The union between conduits and trunking shall be by male bush and couplings with a serrated washer between the bush and the trunking tightly screwed up for earth continuity.

(g) Twin compartment where required to ease the impact of group factor.

3.2.9 Fire Barriers

When electrical services pass through fire compartment walls or floors great care must be taken to ensure that the gaps between the services and structure are properly sealed for acoustic and fire rating properties.

The gaps shall be completely filled to the full thickness of the structure with mineral fibre having a minimum density of 150 Kg/m².

Both faces of the mineral fibre shall be coated with a fire resistant ablative mastic to dry film thickness of at least 1mm. Fire barriers shall only be installed where services pass through pre-determined fire compartments which shall be highlighted by the Royal Holloway University of London.

It shall be the responsibility of the Installer to ensure that all holes surrounding are filled for both acoustic and fire rating properties. It shall also be the Installer’s responsibility to fill all trunking internal spaces/voids with mineral fibre as detailed above.

3.2.10 PVC Dado Trunking

General

(a) The trunking shall be certified as being compliant with the relevant standards as defined by this specification and current legislation covering the product. The trunking installation shall generally be in accordance with the relevant sections of the specification for general trunking.

(b) The Installer shall be responsible for determining the exact length of each trunking by checking the respective general arrangement and room layout drawings and their specific application. This shall be approved by the Services Engineer/Architect prior to manufacture or site fabrication. In general, the trunking shall be of an appropriate length to suit the application whilst also providing the layout and content of services outlets as required by the respective applications.

(c) The Installer shall cost for attending site to offload, distribute and affix the trunking units to the building fabric, including for the pulling of all cables where appropriate.
(d) The Installer shall demonstrate by test certificates or verification documents that the trunking system as offered is compliant with all essential requirements of the relevant standards.

(e) The trunking selected shall be from a ‘family’ of product with a similar appearance, which offers solutions of suitable size to accommodate services in all areas within the project. It shall not be acceptable to have trunkings installed in various areas of differing product appearance and manufacture, unless agreement is received in writing from Royal Holloway University of London.

(f) The trunking shall be designed and manufactured in such a manner that it will accommodate the services, taking due account of their individual and collective requirements and the relevant codes of practice and standards applicable thereto.

(g) The complete trunking shall be manufactured from extruded PVC sections.

(h) There shall be no evidence of fixing screws or assembly components from the external view of the system.

(i) When considering the trunking, the selected system shall be capable of being supplied in a ‘kit form’ for site assembly which shall act as a guide to the ease of maintenance of the product once installed. The trunking system shall be easily modified on site, specifically for alterations at a later stage by Royal Holloway University of London. It shall be demonstrated at tender stage that all extruded sections which form the trunking can be site cut by a commercially available portable mechanical saw.

(j) Where appropriate the trunking shall be provided with manufactured PVC end caps fitted at each end of a module that replicates the profile of the trunking system, secured in such a manner that the method of fixing is not visible, even when tight abutted to a corner. They shall be to the same specification as the remainder of the trunking.

(k) Where required, manufactured internal/external horizontal corners reflecting the exact profile of the linear trunking system shall be provided. Corner pieces shall be complete with cable segregation reflecting that of the linear trunking. Radius control inserts shall be provided at all changes of direction.

**Construction of the System**

(a) The trunking shall be manufactured from PVC extrusions.

(b) The trunking lids shall be removable only by the use of the manufacturers specific tool which shall be demonstrated at the time of sample submission. The Installer shall allow for the provision of these tools within their tender submission in such number as shall be considered appropriate for the initial installation of cabled services by others and for the ongoing maintenance of the system by Royal Holloway University of London.

(c) Quality of workmanship and general appearance shall be of primary importance when submitting the selected trunking for approval. The selected trunking must be designed to ensure maintaining the visual impact of the trunking system once installed.
(d) The trunking shall have minimum dimensions of 210 x 60mm for Dado/Bench unless indicated otherwise and be suitable for the flush mounting of Cat 6 data outlets without the use of a patrice box. The depth of the system shall not generally exceed 80mm except where agreed by Royal Holloway University of London.

(e) The top surface of the trunking shall be radiused or angled and shall slope downwards away from the wall to prevent the placement of items that are likely to cause a risk. The underside of the trunking shall have a straight profile.

(f) The complete system shall be easily cleaned and shall provide minimal potential for the entrapment of dust and general contaminant, generally in a manner in keeping with other components in the same environment. A polymer infill strip fitted to the top rear edge of the trunking shall not be acceptable so as to avoid the entrapment of dust, bacteria or contaminant. All wall deviations at the interface with the trunking shall be mastic or caulk filled to seal the joint.

(g) The trunking system shall be supported by a Manufacturers Product Guarantee for 25 years and the availability of all components within the manufacturers unique scope, guaranteed for that period. All ancillary components mounted therein shall similarly be supported by the respective manufacturers guarantees where applicable.

(h) The trunking system shall be designed, manufactured and assembled as an enclosure in such a manner that an Ingress Protection rating of at least IP50 can be achieved.

(i) Cables shall be retained within the trunking by means of manufactured polymer cable retainers used every metre, change of direction or behind a lid joint.

(j) The trunking shall have facility for formation of apertures into the rear of the system that allows the entry of all services cabling and pipework via a flush mounted wall box located within the studwork partition or blockwork wall. All edges to such apertures shall be grommetted or suitably protected to prevent the chafing of cables on sharp edges formed in the trunking.

(k) It shall be possible to feed the trunking from either end or from surface mounted riser trunking sections which shall be similar in constructional arrangement to the horizontal trunking.

(l) Where manufactured trunking components are of insulating material the material shall have the ignitability characteristic ‘P’ as specified in BS.476.

(m) The trunking shall be supplied to site unwired. Cabling installation shall be as defined elsewhere within this specification.

(n) All integral wiring and cabling shall be completed on site once the trunking modules have been installed only by persons having been inducted in the correct manner of entry and maintenance of the trunking.

(o) The trunking design shall allow the installation to be carried in compliance with IEE Regulations BS 7671 and all other relevant standards.
Segregation of Services

(a) The trunking shall be sub-divided into two screened segregated compartments for LV and IT (voice/data) cabled services. Each compartment when formed shall be separated by PVC extrusions/dividers. Dividers shall not be removable without the use of a mechanical tool and shall provide compartments of suitable and adequate size for the relevant services cabling.

(b) The system must be designed so that screened segregation is maintained at all services interfaces and box assembly locations including the services entry points within the trunking. Where accessory outlet positions occur, segregation of services shall be maintained and 360° access (e.g. access to all compartments) shall be provided to the BS 4662 accessory box assembly at that location.

Dado Trunking Mounted Accessory Boxes (including Back Boxes):

(a) Unless otherwise indicated, accessory boxes used with the trunking shall be UPVC. All boxes shall be manufactured to BS.4662 and shall be of adequate depth to accommodate all accessories without causing compression of the cables. Generally boxes shall be minimum 45mm deep.

(b) Earthing terminals shall be fixed inside each accessory box. All accessory boxes shall have a brass earth stud capable of accepting 2 x 4mm² cables and shall be earthed to the base section of the trunking system.

(c) All accessories shall be flush mounted and the trunking lids shall overlap the boxes.

(d) Accessories with their boxes and trunking lids shall provide a minimum degree of protection of IP41.

(e) Where back boxes are provided in partitions, noggins shall be provided to enable a firm and rigid fixing. The extent and locations of such noggins shall be detailed by the Installer as part of their builders work details. It shall be the Installer’s responsibility to ensure that all noggins are installed in a suitable manner/arrangement to facilitate firm and rigid fixing of back boxes.

(f) All back boxes shall be installed level with the front face of the finished wall.

(g) Intumescent gaskets shall be fitted to all flush back boxes located in 60 minute fire rated walls by the Installer and prior to the installation of the completed trunking system. These shall be to partition suppliers approved detail.

(h) No back box shall be installed immediately behind each other (i.e. back to back) in a common wall or partition, unless agreed in writing with Royal Holloway University of London.

(i) The Installer shall submit details of all proposed back boxes to Royal Holloway University of London, including samples where necessary, prior to installation.

Dado Trunking Mounted Mains Power Sockets, Switches and Fuses

(a) All electrical socket outlets shall be of the 3 pin configuration and shall be in manufactured and mounted in accordance with BS.1363. Unless indicated otherwise, dual earth sockets in accordance with BS.7671 section 607 will be provided.
(b) Where indicated on the drawings spur outlets shall be provided. They shall be manufactured in accordance with BS.5733 be switched or unswitched, with or without flex outlets and with or without pilot lamps as detailed in the drawings. They shall be rated 13 amp and shall be fused to suit the appliance controlled.

(c) There shall be no screws or visible means of the fixing device used to attach components to the panel nor shall there be any obvious blemishes resulting from such fixings.

(d) All power socket outlets shall be flush (panel) mounted directly onto the lid section and shall be fitted so as to be level with or protruding forward of the front face of the trunking lid. All socket outlets shall be supplied as an integral part of the trunking.

(e) Electrical accessories shall be from a full range and available in various colours and configurations including switched double and single pole sockets, with neons and red rockers, and also unswitched sockets.

(f) RCBO units shall be provided on trunkings as detailed within the design and they shall comply with the relevant sections of this specification.

(g) All accessories shall be forward facing and shall not point downwards to the floor.

(h) Where circuit identification is necessary in accordance with the relevant sections of this specification, this shall be engraved onto the trunking lid and filled with a contrasting colour to that of the trunking finish. Proposed engraving details shall be submitted to the Services Engineers for approval to suit the Programme of Works and prior to manufacture.

(i) Surface fitted labels shall not be acceptable.

(j) All electrical components shall be suitable for panel mounting, unless agreed otherwise in writing with the Services Engineer.

Data & Voice Services

(a) The trunking shall be so designed that it can accommodate the mounting of outlet sockets for data and voice services. This will be in the form of a Category 6a structured cabling system.

Trunking Finish

(a) All externally viewed surfaces of the trunking shall be finished in White PVC. Care shall be taken at all times to comply with the requirements of Part M with respect to the contrast between trunking and switch points.

Protection of the Installed Trunking

(a) The Installer shall allow for the supply, delivery, initial fitment and final removal of a purpose made transparent polycarbonate protective cover that can be fitted to the trunking after initial installation of the trunking. This protection shall afford a degree of protection such that falling debris or minor equipment will not cause damage to the trunking and must be capable of being fitted, removed and re-fitted several times to allow access to the system without any detriment to the effectiveness and function of the protection.
(b) The protection shall not be mechanically fixed to the trunking and shall leave no evidence of its fitment after it has been removed.

(c) The method proposed and adopted must be defined by the Installer in their tender return documentation.

(d) Materials used shall satisfy the slow burning fire test for polycarbonate.

(e) In addition, the Installer shall ensure suitable protection to the trunking in transit to site and during site distribution. This shall be afforded by a semi-tack tape to the top and bottom exposed surfaces and any trunking lids that may be prone to damage during transit or initial installation.

**Under Floor Bus bar Trunking**

(a) The installation shall generally comply with the relevant sections of the foregoing specification for trunking installations. The bus bars shall contain line, neutral, earth and separate ‘clean’ earth bars.

(b) The trunking shall be installed below the raised floor.

(c) The trunking system consists of lengths of power tracks. The lengths of track shall fit together using track connectors while corners and branches, if required, shall be formed by flexible corner assemblies or two, three or four way cross connectors.

(d) Access to the power shall be provided every 300mm along the power track by plugs into shuttered sockets, specially designed tap off units which are to be retained by a steel clip. The tap off units feed directly through to the floor boxes via 4.0mm² LSFI conductors (LN and 2xE) contained within maximum three metre length metallic flexible conduit.

(e) Each length of power track shall be rated at 63A and shall have clean and dirty earths.

(f) The trunking shall be as manufactured by Messrs Marshall Tufflex, MK, Ackermann or approved equal.

**General Accessory Boxes**

(a) Unless otherwise indicated, accessory boxes used with steel conduit and with MICS cables shall be metal and those used with insulating materials shall be of a similar insulating material. All boxes shall be manufactured to BS.4662.

(b) Where accessory boxes are of insulating material the material shall have the ignitability characteristic ‘P’ as specified in BS.476.

(c) Accessory boxes shall be suitable for flush or surface mounting, as indicated. Unless otherwise indicated, metal boxes for general use inside buildings shall be of steel with medium category of protection against corrosion; for use in plant rooms they shall be steel with heavy category or protection; and for use outside buildings and in other locations as indicated they shall be of a suitable ingress protected polycarbonate housing.
(d) Accessory boxes shall be of adequate depth to accommodate the accessories without causing compression of the cables. Generally boxes shall be minimum 45mm deep or to a minimum depth for IT accessories, to be confirmed by the Installer.

(e) Earthing terminals shall be fixed inside each accessory box and on the grids of grid-switches. The earthing terminal of each grid shall be connected by a separate protective conductor to the earthing terminal of the box. All accessory boxes shall have a brass earth stud capable of accepting 2 x 4mm² cables.

(f) Front plates of accessories shall be of the material and finish as indicated, but generally the finish of various types of accessories in the same area shall match. For flush mounting, the plates shall overlap the boxes; for surface mounting, the plate shall match the profile of the box, without overlap.

(g) Accessories with their boxes and front plates shall provide a minimum degree of protection of IP41 when used inside buildings and IP56 when used outside buildings or at other locations where indicated.

(h) Accessory boxes shall be fixed to the fabric of the building independently of the connecting cable or conduit, as specified for conduit boxes. Where the accessories have a minimum degree of protection of IP44 the fixings shall not reduce that protection.

(i) Where boxes are provided in partitions noggins shall be provided to enable a firm and rigid fixing. The extent and locations of such noggins shall be detailed by the Installer as part of their builders work details. It shall be the Installer’s responsibility to ensure that all noggins are installed in a suitable manner/arrangement to facilitate firm and rigid fixing of accessory boxes.

(j) All flush boxes shall be recessed approximately 3mm below the finished wall.

(k) Intumescent gaskets shall be fitted to all flush accessory boxes located in 60 min rated walls. Gaskets shall be supplied and installed by the Installer to achieve/maintain minimum integrity of 60 min at the outlet and shall be certified to BS.476 : Part 22. The Installer shall provide details of intended gasket, to the Services Engineer, for approval prior to order. These shall be to the partition suppliers approved detail.

(l) No box shall be installed immediately behind each other (i.e. back to back) in a common wall or partition, unless agreed in writing with the Services Engineer.

(m) All flush boxes shall be zinc plated for corrosion resistance.
Floor Boxes (In Raised Floors)

(a) Floor boxes shall be compatible with the floor tiling for installation in a tile depth of up to 50mm. Boxes shall be rectangular and have easy levelling adjustment to suit tile depths, and shall have a flanged lid with handle and cable outlet and shall have an earth terminal fitted. The lid to have individual height adjuster to suit varying carpet depths. Nominal floor depth (to top of tile) shall be 100mm.

(b) Outlet and junction boxes shall be arranged as shown on the drawings and with the inter-connecting containment shall form a complete compartment system for mains socket outlet wiring, voice and data wiring.

(c) Each floor box shall be complete with switched socket outlets, data and voice outlets. The floor boxes shall be capable of accommodating both telephone T-style adaptors and transformer plug tops while still permitting the floor box lid to close. Floor box depth shall be a maximum of 75mm from the top of the floor tile and each box shall be supplied complete with 3m tails, suitable for connecting to under floor bus bar trunking systems installed.

Floor box make-ups shall be generally as follows:-

2 x 13A Switched Twin Socket Outlets
1 x Double Gang RJ 45 Data Outlet

(d) Floor boxes shall be supplied by the Installer. These shall be as per Messrs Marshall Tufflex, Ackermann or approved equal.

(e) All box lids must be capable of being fully closed with all outlets fully used, including moulded plug tops.