



Tower of London Education- The Reveller
Mechanical and Electrical Particular Specification

P02

Specification Details

Client	Historic Royal Palaces
Project Number	313293
Project Name	Tower of London Education- The Reveller
Specification Title	Mechanical and Electrical Particular Specification
Specification Number	313293-HAH-XX-XX-T-ME-00003
Specification Status	Draft Tender Issue
Specification Revision	P02

Refurbishment of spaces at the Tower of London for educational purposes.

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Ss_25_60_30_40

Individual services penetrations fire-stopping systems

Systems

Ss_25_60_30_40 Individual services penetrations fire-stopping systems

1. Description: Any service passing through a fire compartment
2. System performance: [Ss_25_60_30/210 Design of fire stopping system](#);
; and [Ss_25_60_30/230 Durability](#).
3. System manufacturer: Submit proposals .
4. Penetration seal: Intumescent foam fillers.
5. Execution: [Ss_25_60_30/610 Fire stopping systems workmanship generally](#) and [30-85-30/612 Installing fire stopping system to individual services penetrations](#).
6. System completion: [Ss_25_60_30/810 Cleaning after installation of fire stopping systems](#) and [Ss_25_60_30/820 Inspection of fire stopping systems type A](#).

System performance

Ss_25_60_30/210 Design of fire stopping system

Shared by: [Ss_25_60_30_55 Multiple services penetrations fire-stopping systems](#)

1. Detailed design
 - 1.1. Requirements: Complete the design of the fire stopping system.

Note that all fire stopping designs have to be reviewed and approved by HRP to ensure that the heritage and aesthetic requirements are fully satisfied.
 - 1.2. Purpose: To match the fire rating of the partition, barrier or wall the service is passing through.
 - 1.3. Submittals: Detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_25_60_30/230 Durability

Shared by: [Ss_25_60_30_55 Multiple services penetrations fire-stopping systems](#)

1. Effective design life: 25 years.

Execution

30-85-30/612 Installing fire stopping system to individual services penetrations

1. Size of penetration seal: To match wall thickness.

Ss_25_60_30/610 Fire stopping systems workmanship generally

Shared by: [Ss_25_60_30_55 Multiple services penetrations fire-stopping systems](#)

1. Preparation: Remove loose dust and combustible materials.
2. Openings and gaps: Seal between building elements and services, to provide effective resistance to fire and the passage of smoke. Allow for capping sealants where required. Finish flush with surrounds.
3. Adjacent surfaces: Prevent overrun of filler, sealant or mortar on to finished surfaces.

System completion

Ss_25_60_30/810 Cleaning after installation of fire stopping systems

Shared by: [Ss_25_60_30_55 Multiple services penetrations fire-stopping systems](#)

1. Masking tapes: Remove.
2. Cleaning: Clean off splashes and droppings. Wipe down finishes.

Ss_25_60_30/820 Inspection of fire stopping systems type A

1. Notice for inspection (minimum): 5 working days.

Ω End of System

Ss_25_60_30_55

Multiple services penetrations fire-stopping systems

Systems

Ss_25_60_30_55 Multiple services penetrations fire-stopping systems

1. Description: Any service passing through a fire compartment
2. System performance: [Ss_25_60_30/230 Durability](#);
[Ss_25_60_30/220 Fire performance](#);
and [Ss_25_60_30/210 Design of fire stopping system](#).
3. System manufacturer: Submit proposals .
4. Board barrier: Contractor's design .
5. Framing
 - 5.1. Material: Contractor's design .
 - 5.2. Framing: Contractor's design .
 - 5.3. Fixing: Contractor's design .
6. Sealant
 - 6.1. Sealant type: Contractor's design .
 - 6.2. Primer: Required.
7. Samples required: [Ss_25_60_30/605 Preliminary installation](#).
8. Execution: [Ss_25_60_30/610 Fire stopping systems workmanship generally](#);
[Ss_25_60_30/620 Installing fire stopping boarding](#);
[Ss_25_60_30/640 Applying intumescent foam](#);
[Ss_25_60_30/650 Applying intumescent mortar](#);
[Ss_25_60_30/670 Applying intumescent putty](#);
[Ss_25_60_30/685 Installing mineral wool flexible stopping](#);
[Ss_25_60_30/690 Fixing fire stopping pipe collars](#);
and [Ss_25_60_30/720 Applying fire stopping capping sealant](#).
9. System completion: [Ss_25_60_30/810 Cleaning after installation of fire stopping systems](#) and
[Ss_25_60_30/820 Inspection of fire stopping systems type B](#).

System performance

See [Ss_25_60_30/210 Design of fire stopping system](#) in [Ss_25_60_30_40 Individual services penetrations fire-stopping systems](#)

Ss_25_60_30/220 Fire performance

1. Resistance to fire: To [BS 476-20](#) and [BS 476-22](#), 30 minutes integrity and insulation.
2. Reaction to fire
 - 2.1. Standard: In accordance with Building Regulations;
To [BS 476-7](#);
and To [BS EN 13501-1](#).
 - 2.2. Class: Class 0;
Class 1 to [BS 476-7](#);
Class A1 to [BS EN 13501-1](#);
and Class A2 to [BS EN 13501-1](#).

See [Ss_25_60_30/230 Durability](#) in [Ss_25_60_30_40 Individual services penetrations fire-stopping systems](#)

Execution

Ss_25_60_30/605 Preliminary installation

1. Required samples
 - 1.1. Types: Submit proposals .
 - 1.2. Purpose: For use as an installation reference sample.
 - 1.3. Timing: Construct during preliminary installation. Obtain approval of appearance before proceeding.

See [Ss_25_60_30/610 Fire stopping systems workmanship generally](#) in [Ss_25_60_30_40 Individual services penetrations fire-stopping systems](#)

Ss_25_60_30/620 Installing fire stopping boarding

1. Framing: Across face of opening.
2. Boarding
3. Fixing
 - 3.1. Centres: 100 mm.
4. Finishing: Countersink screw heads and Finish joint sealant flush with boards; rub down to receive paint finish.

Ss_25_60_30/640 Applying intumescent foam

1. New joints: Remove builder's debris, mortar droppings, grease, and other contaminants.
2. Old joints: Clean and remove existing sealant from each joint.
3. Priming: Lightly moisten substrate with water.
4. Application: Fill joint to approximately half its depth, and allow foam to expand to face of joint.
5. Trimming: Trim excess foam to give a neat, flush appearance.

Ss_25_60_30/650 Applying intumescent mortar

1. Sequence: Install mortar after services are permanently installed.
2. Shuttering: Install suitable shuttering panels to the faces of the opening.
3. Temperature: Do not apply mortar when it could be damaged by frost.
4. Mortar cure: Do not disturb mortar before final set has taken place.
5. Shuttering removal: After mortar has cured.

Ss_25_60_30/670 Applying intumescent putty

1. Sequence: Install putty after services are permanently installed.
2. Putty cure: Do not disturb putty before final set has taken place.

Ss_25_60_30/685 Installing mineral wool flexible stopping

1. Packing: Compress mineral wool and fit into full depth of opening or gap. Pack until fully filled.

Ss_25_60_30/690 Fixing fire stopping pipe collars

1. Opening: Provide an opening nominally 20–50 mm greater in diameter than the collar.
2. Fixing: Secure collar to surround.

Ss_25_60_30/720 Applying fire stopping capping sealant

1. Width of sealant: Within limits set by sealant manufacturer.

2. Excessive gaps: Submit proposals .
3. Depth of sealant: As required by sealant manufacturer to achieve specified fire resistance.
4. Width to depth ratio: As required by sealant manufacturer to achieve specified fire resistance.
5. Temperature: Do not apply water based sealants when they could be damaged by frost.

System completion

See [Ss_25_60_30/810](#) Cleaning after installation of fire stopping systems in [Ss_25_60_30_40](#)
[Individual services penetrations fire-stopping systems](#)

Ss_25_60_30/820 Inspection of fire stopping systems type B

1. Notice for inspection (minimum): 5 working days.

Ω End of System

Ss_50_30_04_97

Above-ground internal stack wastewater drainage systems

Systems

Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems

1. **Description:** The contractor shall install, test & commission a new above ground drainage system to serve the water point in Cradle Tower.

There are no drainage works required in Bowyer Tower.

The new drainage connection serving the water point shall connect to the existing external copper waste pipe which connects directly into the below ground drainage system.

All works shall be as indicated on the drawings.

All small diameter waste pipe-work 32mm and 40mm diameter shall be installed using MUPVC as Polypipe Terrain or equal and approved.

All new internal drainage shall be installed in accordance with BS EN 12056. Each appliance shall be supplied with a trapped connection which shall be of the ventilating anti syphon type.

All penetrations through slabs or fire compartments shall be provided with a fire collar round the drain pipe at the same rating as the fire compartment wall. All drains to be sleeved at penetrations shall be entirely sealed with acoustic sealant. Fires sleeves shall be provided for MUPVC pipe-work which passes through separate fire compartments.

Falls on soil, waste and vent stacks shall not fall below the minimum stated in BS-EN 12056. Access Caps to be provided at all changes of direction and end of waste pipework runs.

Access pipes to be inserted above branch connections and stack connection points to underground drainage. Intumescent fire collars & sleeves to be fitted to plastic pipework 50mmø and above passing through fire rated walls and floors.

All drains shall be fully pressure tested and inspected to the requirements of Building Control. The drainage system shall be fully compliant with the requirements for BS EN 12056- 2:2000.

2. **System manufacturer:** Contractor's choice
3. **Sanitary pipework**
 - 3.1. Small diameter branch discharge pipework
 - 3.1.1.Traps: [Pr_65_52_25_75 Sanitary appliance traps.](#)
 - 3.1.2.Pipelines and fittings: [Pr_65_52_03_87 Unplasticized polyvinyl chloride \(PVC-U\) drainage pipes and fittings.](#)
 - 3.1.3.Accessories for jointing: Solvent welding cement.
 - 3.1.4.Supports: [Pr_20_85_09_01 Above-ground drainage pipe brackets.](#)
 - 3.2. Large diameter branch discharge pipework
 - 3.2.1.Pipelines and fittings: [Pr_65_52_03_52 Modified unplasticized polyvinyl chloride \(MUPVC\) pipes and fittings.](#)
 - 3.3. Discharge stack pipework
 - 3.3.1.Pipelines and fittings: [Pr_65_52_03_61 Polyethylene \(PE\) drainage pipes and fittings.](#)
4. **Pipework identification:** [90-90-55/480 Mechanical plant and equipment identification labels generally.](#)
5. **Fire-stopping**

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- 5.1. Floor penetrations: [Pr_65_52_61_63 Pipe sleeves type A](#).
 - 5.2. Wall penetrations: [Pr_65_52_61_63 Pipe sleeves type A](#).
 6. Execution: [Ss_50_30_04/622 Access to above-ground wastewater drainage systems for testing and maintenance type A](#).
 7. System completion: [Ss_50_30_04/820 Above-ground wastewater drainage system pipework airtightness test](#).

Products

90-90-55/480 Mechanical plant and equipment identification labels generally

Shared by: [Ss_65_40_33_90 Toilet extract ventilation systems](#) and [Ss_55_70_38_15 Cold water supply systems](#)

1. Manufacturer: Submit proposals .
2. Material: Face engraved rigid plastic laminate.
3. Label size: Manufacturer's standard .
4. Information to be included: Equipment name;
Equipment reference number;
and Service.
5. Execution: [Pr_40_10_57/611 Installing mechanical plant and equipment identification](#).

Pr_20_85_09_01 Above-ground drainage pipe brackets

1. Manufacturer: Contractor's choice .

Pr_65_52_03_52 Modified unplasticized polyvinyl chloride (MUPVC) pipes and fittings

1. Manufacturer: Contractor's choice
2. Material and standard: Manufacturer's standard .
3. Jointing type: Push fit ring seal.
4. Integral accessories: Access fittings.

Pr_65_52_03_61 Polyethylene (PE) drainage pipes and fittings

1. Manufacturer: Geberit Sales Ltd
2. Standard: To [BS EN 1519-1](#).
3. Third-party product certification: BBA Agrément certificate.
4. Colour: Black.
5. Size (nominal): DN 110.
6. Integral accessories: Access fittings.
7. Execution: [Pr_65_52_03/630 Fixing and jointing rainwater and above ground drainage pipes](#).

Pr_65_52_03_87 Unplasticized polyvinyl chloride (PVC-U) drainage pipes and fittings

1. Manufacturer: Marley Plumbing & Drainage
2. Product reference: PVCu Soil and Vent System
3. Joint type: Solvent weld.
4. Nominal size: 110 mm.
5. Colour: White.

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6. **Brackets:** Marley Pipe Support System.
 7. **Fixings:** Nut and bolt.
 8. **Accessories:** Durgo Air Admittance Valves;
Vent Terminals;
and WC Connectors.

Pr_65_52_25_75 Sanitary appliance traps

1. **Manufacturer:** Marley Plumbing & Drainage
2. **Product reference:** Anti-siphon bottle trap and Tubular P Trap
3. **Standard:** To [BS EN 274-1](#).
4. **Jointing:** Manufacturer's standard .
5. **Material:** Plastics and Plastics, chrome plated.
6. **Colour:** White.
7. **Size:** As branch discharge pipework.

Pr_65_52_61_63 Pipe sleeves type A

Shared by: [Ss_55_70_38_15 Cold water supply systems](#)

1. **Description:**
2. **Manufacturer:** FloPlast Ltd.
3. **Product reference:** FloPlast Intumescent Wrap Ref: FW110.

Execution

Pr_40_10_57/611 Installing mechanical plant and equipment identification

1. **Fixing:** Fix with adhesive to equipment.
2. **Position:** On equipment.

Pr_65_52_03/630 Fixing and jointing rainwater and above ground drainage pipes

1. **Fixing**
 - 1.1. **Supports**
 - 1.1.1.Stability: Fix securely.
 - 1.1.2.Fixing centres (nominal):
 - 1.2. **Pipework**
 - 1.2.1.Alignment: Plumb and/ or true to line.
 - 1.2.2.Externally socketed pipes and fittings: Fix with socket ends forming inlet for each individual pipe.
2. **Jointing**
 - 2.1. **Jointing differing pipework systems:** Use adaptors intended for the purpose.
 - 2.2. **Cut ends of pipes:** Clean and square. Remove burrs and swarf. Chamfer ends of plastics pipes before inserting into ring seal sockets. Where metal pipes are to be used, recoat bare metal with appropriate primer and paint.
 - 2.3. **Jointing or mating surfaces:** Clean and, where necessary, use jointing lubricant immediately to allow safe and efficient jointing assembly.
 - 2.4. **Unsealed joints:** Wedge unsealed joints to cast pipes with timber or sheet lead cut-offs to centralize pipe joints and reduce rattling.

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- 2.5. Expansion joint pipe sockets: Fix rigidly to buildings. Elsewhere, provide brackets and fixings that allow pipes to slide.
 - 2.6. Solvent-welded pipelines: Install ring seal joints in all long runs of solvent welded pipework, as movement joints.
 - 3. Spacing (maximum):
 - 4. Wall and floor penetrations:

Ss_50_30_04/622 Access to above-ground wastewater drainage systems for testing and maintenance type A

- 1. General: Install pipework with adequate clearance to permit testing, cleaning and maintenance, including painting where necessary.
- 2. Access fittings and rodding eyes: Position to avoid obstruction.

System completion

Ss_50_30_04/820 Above-ground wastewater drainage system pipework airtightness test

- 1. Preparation
 - 1.1. Open ends of pipework: Temporarily seal using plugs.
 - 1.2. Test apparatus: Connect a 'U' tube water gauge and air pump to pipework via a plug or through trap of an appliance.
- 2. Testing: Pump air into pipework until gauge registers 38 mm.
- 3. Required performance: Maintain pressure of 38 mm without loss for at least 3 minutes.

Ω End of System

Ss_55_70_38_15 Cold water supply systems

Systems

Ss_55_70_38_15 Cold water supply systems

1. Description:

The water point provided to refill drinks bottles in Cradle Tower shall be provided with a new potable water supply extended from an existing 15mm water supply capped adjacent to the entrance.

The existing mains water supply shall be traced through its length and verified as potable with a supporting water quality laboratory test.

The extended water main shall be extended in the existing timber floor build up to the new water point.

There are no domestic water works planned for Bowyer Tower.

Pipework connections to sanitary fittings and equipment shall be fitted with ¼ turn ball valves.

The system shall be installed to be self-venting with automatic air vents at all high points and drain cocks at all low points to facilitate drain down.

The water system shall be installed in accordance with BS 6700 Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages, the CIBSE Public Health Engineering Guide G and the local water authority byelaws.

The domestic cold water distribution pipework shall be copper, with fittings entirely suitable for potable water supply. The pipework shall be insulated in accordance with BS 5422, BS 5970 and BS EN ISO 12241.

2. System performance: [Ss_55_70_38/220 Cold water supply](#).
3. Arrangement: Mains.
4. Water meters: Existing meter to be validated and replaced if necessary
5. Pipelines
 - 5.1. Below ground: [Pr_65_52_63_63 Polyethylene \(PE\) water pipes and fittings](#).
 - 5.2. Above ground: [Pr_65_52_63_17 Copper pipelines type A](#).
6. Pipeline accessories
 - 6.1. Gauges: [Pr_65_52_34_66 Pressure gauges](#).
 - 6.2. Accessories: [Pr_65_52_61_63 Pipe sleeves type A](#) and [90-10-60/400 Pipeline strainers](#).
7. Valves
 - 7.1. Float valves: Manufacturer's Standard
 - 7.2. Isolating valves: As per mechanical schedules
 - 7.3. Check valves: As per mechanical schedules
 - 7.4. Draining devices: [Pr_65_54_95_27 Draining taps](#).
8. Fire-stopping: Individual services penetrations fire-stopping system.
9. Thermal insulation
 - 9.1. Pipelines: Mineral wool pipe section insulation.

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- 9.2. Tanks: [Pr_80_77_76_62 Phenolic foam insulation](#).
10. Vibration isolation: [Pr_80_77_94_40 Inertia bases](#) and [Pr_80_77_94_30 Flexible vibration isolation hoses](#).
11. Outlets: Refer to Architect's specification.
12. Water dispensers: [Pr_40_70_15_96 Water coolers](#)
13. Controls: Water supply systems control.
14. Accessories: [Pr_80_77_27_15 Channel supports](#).
15. Plant and equipment identification: [Pr_40_10_57_78 Self-adhesive colour pipe bands](#); [90-90-55/480 Mechanical plant and equipment identification labels generally](#); [90-90-55/490 Valve charts and schematics generally](#); and [90-90-55/495 Valve identification labels generally](#).
16. Execution: [Ss_55_70_38/620 Installing hot and cold water systems generally](#); [Ss_55_70_38/650 Hydraulic pressure testing of hot and cold water supply systems](#); and [Ss_55_70_38/610 Removing hot and cold water systems](#).
17. System completion: [Ss_55_70_38/820 Inspection and test records](#); [Ss_55_70_38/850 Water quality tests type B](#); and [Ss_55_70_38/840 Documentation](#).

System performance

Ss_55_70_38/220 Cold water supply

1. Incoming mains water supply: Identify possible problems and submit report.
2. Type of system: Mains fed
3. Design parameters: To [BS 8558](#) and To [BS EN 806-2](#).

Products

90-10-60/400 Pipeline strainers

1. Manufacturer: OvenTrop
2. Execution: [Pr_65_57_96/650 Installing strainers](#).

90-10-65/320 Copper pipeline jointing materials type A

1. Standards: To relevant BS Standards as below
 - 1.1. Lead free solder for capillary fittings: To [BS EN ISO 9453](#).
 - 1.2. Brazing filling: To [BS EN ISO 17672](#).
 - 1.3. Flange jointing rings: To [BS EN 1514-4](#).

90-10-65/450 Pipeline supports

1. Manufacturer: Contractor's choice .
2. Arrangement: Manufacturer's standard .
3. Material: Brass and Steel.
4. Execution: [Pr_20_29_14/620 Installing pipeline supports](#).

90-10-90/305 Connections for accessories

1. Capillary: To [BS EN 1254-1](#).
2. Compression for copper tubes: To [BS EN 1254-2](#).
3. Compression for plastics pipes: To [BS EN 1254-3](#).
4. Flanged for cast iron: To [BS EN 1092-2](#).

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5. Flanged for copper alloy: To [BS EN 1092-3](#).
 6. Threaded: As below
 - 6.1. Where pressure-tight joints are made on the threads: To BS 21 or [BS EN 10226-1](#).
 - 6.2. Where pressure-tight joints are not made on the threads: To [BS EN ISO 228-1](#).

See [90-90-55/480 Mechanical plant and equipment identification labels generally](#) in [Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems](#)

90-90-55/490 Valve charts and schematics generally

1. Material: Paper print, glazed frame.
2. Information to be included: Location and identification of pipework regulating, isolating and control valves.
3. Execution: Installing valve charts and schematics generally.

90-90-55/495 Valve identification labels generally

1. Material: Face engraved rigid plastic laminate.
2. Colour: As below
 - 2.1. Background: White.
 - 2.2. Lettering: Black.
3. Typography: As below
 - 3.1. Font: Helvetica medium.
 - 3.2. Size: Manufacturer's standard .
4. Information: Purpose and reference number.
5. Execution: [Pr_40_10_57/630 Installing valve identification labels](#).

90-90-95/310 Mountings generally

1. Criteria: Ensure that vibration generated by the engineering services is not transmitted to pipework, ductwork, the building and supporting structure.
2. Overload capacity (minimum): 50%.
3. Colour code: Identify for load and deflection rating.
4. Marking: Label with load capacity.

Pr_40_10_57_78 Self-adhesive colour pipe bands

1. Description: Should be added at regular intervals along pipework
2. Standards: To [BS 1710](#).
3. Identification type: Adhesive colour bands.
4. Execution: [Pr_40_10_57/660 Installing identification on pipework](#).

Pr_40_70_15_96 Water coolers

1. Description: Drinking water point as specified by Jamie Foreman Architects
2. Third-party certification: [WRAS](#)-approved.
3. Temperature of delivered water: Ambient, less than 20°C

Pr_65_52_34_66 Pressure gauges

1. Description:
2. Manufacturer: Contractor's choice .
3. Standard: To [BS EN 837-1](#).

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4. Diameter: 50 mm.
 5. Scale subdivisions: 20 kPa (0.2 bar) for a maximum scale value of 1000 kPa (10 bar).
 6. Material: Stainless steel.
 7. Connections: Manufacturer's standard .
 8. Execution: [Pr_65_52_34/630 Installing pressure gauges.](#)

See [Pr_65_52_61_63 Pipe sleeves type A](#) in [Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems](#)

Pr_65_52_62_27 Elastomeric ring seals

1. Description:
2. Standards
 - 2.1. Compression: To [BS EN 1254-3](#).
 - 2.2. Electrofusion: To [BS EN 12201-3](#).
 - 2.3. Socket and spigot: To [BS EN 12201-3](#).
 - 2.4. Solvent cement: To [BS EN ISO 1452-3](#).
 - 2.5. Elastomeric ring seal: To [BS EN ISO 1452-3](#).

Pr_65_52_63_17 Copper pipelines type A

1. Description:
2. General requirements: [90-10-65/320 Copper pipeline jointing materials type A](#) and [Pr_65_52_63_18 Copper pipeline fittings type A](#).
3. Manufacturer: Yorkshire Copper Tube
4. Standard: To [BS EN 1057](#).
5. Grade: R250 (up to 42mm) and R290(> 42mm).
6. Finish: Chrome-plated to [BS EN ISO 1456](#) (were exposed) and Plain (Where concealed).
7. Options: [90-10-65/450 Pipeline supports](#).
8. Execution: [Pr_65_52_63/630 Installing copper pipelines](#) and [Pr_65_52_63/635 Brazed joints in copper and copper alloy pipes](#).

Pr_65_52_63_18 Copper pipeline fittings type A

1. Description:
2. Manufacturer: Yorkshire Copper Tube
3. Standards
 - 3.1. Capillary: To [BS EN 1254-1](#).
 - 3.2. Compression: To [BS EN 1254-2](#)

Pr_65_52_63_63 Polyethylene (PE) water pipes and fittings

1. Description:
2. General requirements: [Pr_65_52_62_27 Elastomeric ring seals](#) .
3. Manufacturer: Refer to mechanical drawings
4. Standards
 - 4.1. Pipes: Refer to mechanical drawings
5. Colour: Blue.
6. Execution: [Pr_65_52_63/645 Installing plastics pipelines](#);
[Pr_65_52_63/700 Installing buried pipelines](#);
and [Pr_65_52_63/705 Protection of buried pipelines](#).

Pr_65_54_95_27 Draining taps

1. General requirements: [90-10-90/305 Connections for accessories](#) .
2. Description:
3. Manufacturer: Contractor's choice .
4. Standard: To [BS 2879](#).
5. Size:
6. Arrangement: 1.
7. Material: Bronze.
8. Connections: Threaded.
9. Accessories: Lever pattern key and Spare hose union.
10. Execution: [Pr_65_54_95/610 Installation of valves generally](#) and [90-10-90/670 Valve tests](#).

Pr_80_77_27_15 Channel supports

Shared by: [Ss_65_40_33_90 Toilet extract ventilation systems](#)

1. Description:
2. Manufacturer: Submit proposals . Contractor Design.
3. Support type: Submit proposals .
4. Third party certification:

Pr_80_77_76_62 Phenolic foam insulation

1. Description:
2. Manufacturer: Isover
3. Product reference: Glasswool & ULTIMATE faced sections
4. Standard: To [BS EN 13166](#).
5. Thermal conductivity: 0.018 W/m·K at 0°C.
0.018 W/m·K at 10°C.
0.023 W/m·K at 50°C.
0.025 W/m·K at 75°C.
6. Execution: [Pr_80_77_76/640 Installing phenolic foam insulation on pipelines](#) and [Pr_80_77_76/755 Installing at non-loadbearing pipelines supports](#).

Pr_80_77_94_30 Flexible vibration isolation hoses

1. General requirements: [90-90-95/310 Mountings generally](#) .
2. Description:
3. Manufacturer: Heating Appliances & Services Ltd (HASL)
4. Execution: Installation of flexible hoses and rubber bellows.

Pr_80_77_94_40 Inertia bases

1. General requirements: [90-90-95/310 Mountings generally](#) .
2. Description:
3. Manufacturer: Manufacturers propriety inertia base
4. Inertia bases type: Manufacturer's standard .
5. Material: Welded steel channel perimeter frame.
6. Execution: [Pr_80_77_94/610 Cast in situ bases](#).

Execution

90-10-90/670 Valve tests

1. Standard: To [BS EN 12266-1](#).

Pr_20_29_14/620 Installing pipeline supports

1. Position
 - 1.1. In plant rooms: One piece strap, sling rod, washer and nuts.
 - 1.2. Distribution corridors and risers: All pipework outwith plantrooms to be exposed and mounted on cable trays.
 - 1.3. Surface mountings: Split ring, spacer nipple and backplate.

See [Pr_40_10_57/611 Installing mechanical plant and equipment identification](#) in [Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems](#)

Pr_40_10_57/630 Installing valve identification labels

1. Fixing: Secure with metal chain.

Pr_40_10_57/660 Installing identification on pipework

1. Application of basic identification colour: Coloured bands as [BS 1710](#) clause 3.3 and Over the whole length of the pipe.
2. Safety colour identification: On or next to the colour bands.
3. Information: Colour bands as [BS 1710](#) appendix D.
4. Direction of flow: Indication arrow and the word FLOW or the letter F and Indication arrow and the word RETURN or the letter R.

Pr_65_52_34/630 Installing pressure gauges

1. Position: Downstream of outlet check valve and upstream of outlet stop valve on pump supply.

Pr_65_52_63/610 Pipelines installation generally

1. Standard: [HVCA TR/20/4](#) and [HVCA TR/20/5](#).
2. Dissimilar metals: Prevent electrolytic corrosion.

Pr_65_52_63/615 Installing pipeline fittings

1. Bushes: Use only at radiators.
2. Fabricated junctions and fittings: Same material as the main pipeline.
3. Demountable joints: Regularly spaced along pipeline runs and at items of equipment.

Pr_65_52_63/630 Installing copper pipelines

1. General requirements: [Pr_65_52_63/690 Spacing of pipelines](#) ;
[Pr_65_52_63/615 Installing pipeline fittings](#);
[Pr_65_52_63/610 Pipelines installation generally](#);
and [Pr_65_52_63/710 General inspection and testing](#).
2. Standard: In accordance with CDA publications [88 Copper tube in buildings](#) and [149 Large diameter copper tubes](#).
3. Jointing method
 - 3.1. Permanently concealed joints: Brazed.

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- 3.2. Accessible joints: Compression, up to 54 mm;
Press fit;
and Push fit.

Pr_65_52_63/635 Brazed joints in copper and copper alloy pipes

1. Preparation, marking and sealing: In accordance with [BS EN 14324](#).

Pr_65_52_63/645 Installing plastics pipelines

1. General requirements: [Pr_65_52_63/690 Spacing of pipelines](#) ;
[Pr_65_52_63/615 Installing pipeline fittings](#);
[Pr_65_52_63/610 Pipelines installation generally](#);
and [Pr_65_52_63/710 General inspection and testing](#).
2. Pipeline material: Unplasticized polyvinylchloride.
3. Jointing method: To suit tube.

Pr_65_52_63/690 Spacing of pipelines

1. Minimum clearance between insulated pipelines and
- 1.1. Wall finish: 25 mm.
 - 1.2. Ceiling finish or soffit: 100 mm.
 - 1.3. Floor: 150 mm.
 - 1.4. Electrical services: 150 mm.
 - 1.5. Adjacent services: 100 mm.
 - 1.6. Uninsulated pipeline: 75 mm.
 - 1.7. Another insulated pipeline: 25 mm.
2. Minimum clearance between uninsulated pipelines and
- 2.1. Wall finish: 25 mm.
 - 2.2. Ceiling finish or soffit: 100 mm.
 - 2.3. Floor: 150 mm.
 - 2.4. Electrical services: 150 mm.
 - 2.5. Adjacent services: 150 mm.
 - 2.6. Another uninsulated pipeline: 25 mm.

Pr_65_52_63/700 Installing buried pipelines

1. Depth of cover: 750 mm.
2. Set out: Lay in straight lines.
3. Concealment: Do not lay under surfaced footpaths or drives.
4. Trench excavations: Carefully prepare to a firm even base. Remove sharp objects and replace with pea gravel to give 100 mm (minimum) cover above and below the pipe.
5. Installation: Thoroughly clean lengths of pipe internally before laying. Temporarily cap until jointing takes place. After laying and jointing keep leading end capped.
6. Thrust blocks: Install at changes of direction and blank ends.
7. Backfilling: Excavated material free from large stones and sharp objects. Leave joints exposed until after pipeline pressure test. Lay and compact in 300 mm maximum layers. Do not use heavy compactors before backfill is 600 mm deep.

Pr_65_52_63/705 Protection of buried pipelines

1. Earth cover (minimum)
- 1.1. Water pipework: 900 mm, 1200 mm maximum.

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- 1.2. Under roadways: 900 mm.
 2. Protection: Apply an anticorrosive, non- cracking, non-hardening, waterproof sealing tape.
 3. Application: After cleaning pipework wrap two layers contrawise spirally around the pipe, with 50% minimum overlap.
 4. Marker tape: Not required.

Pr_65_52_63/710 General inspection and testing

1. Safety precautions: In accordance with [HSE GS 4](#).

Pr_65_54_95/610 Installation of valves generally

1. Installation: In accordance with [BS 6683](#).
2. Position: As detailed on mechanical drawings and schematics
3. Isolation and regulation valves: Provide at equipment and on sub-circuits.
4. Access: Locate valves so they can be readily operated and maintained. Locate next to equipment which is to be isolated.
5. Connection to pipework: Fit with joints that suit the pipe material.

Pr_65_57_96/650 Installing strainers

1. Angle type: Install with strainer cap at the bottom. Inlet at the top or side.
2. Y-type: Install in direction of flow with the pocket in the horizontal plane.

Pr_80_77_76/610 Installing insulation and protection products generally

1. Standard: In accordance with [BS 5970](#).
2. Timing: Insulate after installed system has been fully tested and joints proved sound.
3. Insulation: Do not enclose adjacent units together.
4. Clearance: Maintain between pipes.
5. Finish: Neatly finish joints, corners, edges and overlaps.

Pr_80_77_76/640 Installing phenolic foam insulation on pipelines

1. General requirements: [Pr_80_77_76/610 Installing insulation and protection products generally](#) .
2. Joints: Close butt, seal with 50 mm wide class 0 tape on both longitudinal and circumferential joints.
3. At fittings: Mitre. Secure with tape.
4. Vapour seal: Tape exposed insulation membrane. Seal vapour barrier at pipe support with class 0 tape.

Pr_80_77_76/755 Installing at non-loadbearing pipelines supports

1. Insulation: Carry through pipe support.

Pr_80_77_94/610 Cast in situ bases

1. Supported equipment: Arrange equipment on base to distribute load evenly.

Ss_55_70_38/610 Removing hot and cold water systems

1. Scope: Stripout to include all items of plant, tanks / cisterns, distribution pipework, insulation / protection, pipework hangers / supports, controls and electrical wiring associated with the systems. Any damage to the building or finishes to be rectified once stripout is complete.

Ss_55_70_38/620 Installing hot and cold water systems generally

1. **Standard:** To [BS 8558](#) and [BS EN 806-4](#).
2. **Performance:** Free from leaks and the audible effects of expansion, vibration and water hammer.
3. **Fixing of equipment, components and accessories:** Fix securely, parallel or perpendicular to the structure of the building.
4. **Preparation:** Immediately before installing tanks and cisterns on a floor or platform, clear the surface completely of debris and projections.
5. **Corrosion resistance:** In locations where moisture is present or may occur, avoid contact between dissimilar metals by use of suitable washers, gaskets, and the like.

Ss_55_70_38/650 Hydraulic pressure testing of hot and cold water supply systems

1. **Standard:** To [BS 8558](#) and [BS EN 806-4](#).
2. **Notice (minimum):** 1 week.
3. **Pressure:** 1.5 times working pressure
4. **Duration of test:** 1 h.

System completion

Ss_55_70_38/820 Inspection and test records

1. **Reports:**
2. **Construction phase reports:** System design is commissionable;
Post-installation;
System cleanliness;
and System commissionable.
3. **Records for water systems:** In accordance with [BSRIA 2/89.3](#).
4. **Record sheets**
 - 4.1. **Submission:** On completion.
 - 4.2. **Number of copies:** Three.

Ss_55_70_38/840 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Paper copy.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** Location and arrangement of plant in plant rooms;
Location, size and route of hot and cold water services;
Location, route and depth of underground services;
Location and identification of regulating, isolation and control valves;
and Location of outlets.
 - 2.2. **Format:** A1 paper print and Electronic.
 - 2.3. **Number of copies:** Two.
3. **Submittal date:** At handover.
4. **Wholesome water consumption notice:** Submit within five days.

Ss_55_70_38/850 Water quality tests type B

1. Standard: To [BS EN 806-4](#).
2. Samples
 - 2.1. Sample points: Main supply to site;
 - 2.2. Samples for analysis: Submit samples for bacteriological analysis.
3. Water temperature: Record at each sampling point at the time of taking the sample.
4. Test results
 - 4.1. Record: Details of all analyses.
 - 4.2. Submit: On completion.
 - 4.3. Number of copies: One.

Ω End of System

Ss_60_40_37_26

Electric heating systems

Systems

Ss_60_40_37_26 Electric heating systems

1. **Description:** Electric convector heaters shall be used to provide heating in both lift stairwell area.

These shall be controlled via the supplied Dimplex bluetooth remote controllers which shall be fixed in their wall cradles, mounted in the storage cupboard as indicated on the drawings.

Temperature and time clock profiles to be agreed with the client prior to handover.

2. **Heat emitters:** [Pr_70_60_36_74 Room heaters Type A](#)
3. **Controls**
 - 3.1. **Type:** External to appliance, separately controlled.
 - 3.2. **Connectivity:** Wired.
 - 3.3. **Type of controller:** Thermostat and timed control.
 - 3.4. **Features:** Thermal overload protection – automatic reset. Frost protection mode. Automatic on/ off timer. Manual override facility. Program retention during power failure by battery back-up. Thermal overload protection – automatic reset. Thermal overload protection – manual reset.
4. **Plant and equipment identification:** [Pr_40_10_57_23 Electrical diagrams Type A](#);
[Pr_40_10_57_24 Electrical identification labels](#)
5. **Execution:** [Ss_60_40_37/640 Installing electric heating systems](#)
6. **System completion:** [Ss_60_40_37/845 Demonstrations](#); [Ss_60_40_37/845 Demonstrations Type A](#); [Ss_60_40_37/880 Servicing and maintenance](#); [Ss_60_40_37/840 Performance testing](#)

Products

Pr_40_10_57_23 Electrical diagrams Type A

1. **Description:** As below
2. **Material:** Engraved plastics laminate.
3. **Format:** Single line engineering drawings to [BS EN 61082-1](#).
4. **Information to be included:** Circuits containing equipment vulnerable to testing. Earth fault loop impedance values at each item of switchgear. Prospective fault current values at each item of switchgear. Protective device types, ratings and function. Switchgear ratings. Cable types and sizes. Supply characteristics.
5. **Size:** A3.

Pr_40_10_57_24 Electrical identification labels

1. **Description:** As below
2. **Manufacturer:** Contractor's choice
3. **Standards:** To [BS ISO 3864-1](#). To [BS EN ISO 7010](#).

Pr_70_60_36_74 Room heaters Type A

1. **Description:** Dimplex BFHE Plinth Heater
2. **Manufacturer:** [Glen Dimplex Heating and Ventilation](#)
3. **Contact details**

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- 3.1. Address: Millbrook House
Grange Drive
Hedge End
Southampton
Hampshire
SO30 2DF
 - 3.2. Telephone: +44 (0)344 8793587
 - 3.3. Web: www.gdhv.com
 - 3.4. Email: aftersales@dimplex.com
 - 4. Execution: [Pr_70_60_36/611](#) Installing heat emitters generally Type A

Execution

Pr_70_60_36/611 Installing heat emitters generally Type A

- 1. Fixing: *Provide all brackets/ stands and fixings to securely install heat emitter.*

Ss_60_40_37/640 Installing electric heating systems

- 1. Standard: In accordance with [BS 7671](#).

System completion

Ss_60_40_37/840 Performance testing

- 1. General: Demonstrate the performance of the installations.
- 2. Reports: Submit on completion.

Ss_60_40_37/845 Demonstrations

- 1. Running of plant
 - 1.1. Operation: Run, maintain and supervise the installations under normal working conditions.
- 2. Instruction: Instruct and demonstrate the purpose, function and operation of the installations.

Ss_60_40_37/845 Demonstrations Type A

- 1. Running of plant
 - 1.1. Operation: Run, maintain and supervise the installations under normal working conditions.

Ss_60_40_37/880 Servicing and maintenance

- 1. Requirement: Undertake for 12 months after completion.

Ω End of System

Ss_65_40_33_90 Toilet extract ventilation systems

Systems

Ss_65_40_33_90 Toilet extract ventilation systems

1. Description:

Extract ventilation serving the lunch room spaces in both Cradle and Bowyer Towers shall be provided by local, ducted extract systems and shall consist of the extract fan, ducting, slot grilles to the spaces and discharge louvres to outside.

The contractor shall, install, test & commission all new extract ventilation systems. The new fans shall be provided with time controlled power supplies to ensure that the fans only operate when the spaces are in use. Speed control shall be set on the fan units themselves, there is no BMS control requirement.

In Cradle Tower, the ducted extract systems shall exhaust via the existing external air bricks on the façade detailed by the architect. The existing air brick covers shall be carefully removed and handed to HRP for retention.

In Bowyer Tower, the ducted extract systems shall exhaust via a new louvre located above the entrance door, detailed by the architect.

When distributing through fire compartments ductwork shall be provided with suitable fire sleeves/dampers.

The preference is not to use flexible connections, but if there is no other solution the maximum length shall be no greater than 300mm. Where ductwork is visible no flexible connections shall be installed.

Ceiling mounted grilles will serve each lunch room areas. The extract grilles shall be installed using the manufacturers standard mounting frame and set out using the architects reflected ceiling plan with locations approved prior to installation.

Access hatches shall be provided where required to the Architects requirements to allow the VCDs, valves and fire dampers to be accessed for commissioning.

Return air shall be provided via undercut doors.

The entire ventilation system shall be commissioned and seasonally commissioned by a reputable and reliable commissioning engineer, The commissioning engineer shall adjust the ventilation system to ensure that the flow rates are within 5% of design at each grille.

2. System performance: [Ss_65_40_33/210 Design of ventilation systems](#)
3. Room extract air terminal devices: Manufacturers standard fitting
4. Air ductwork and accessories
 - 4.1. Ductwork: [Pr_65_65_25_72 Rectangular sheet metal ductwork and fittings](#) and [Pr_65_65_25_14 Circular sheet metal ductwork and fittings](#).
 - 4.2. Accessories: [Pr_65_65_23_20 Duct access panels](#)
5. Fire-stopping: Individual services penetrations fire-stopping system.
6. Thermal insulation on extract air ductwork: Refer to Equipment Schedules
7. Acoustic treatment: [Pr_65_67_78_72 Rectangular attenuators](#)
8. Extract fans: Nuair MEV-Eco
9. External exhaust air terminals: Existing External louvres to be retained

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10. Accessories: [Pr_80_77_27_15 Channel supports](#).
 11. Controls: PIR
 12. Identification of ductwork and equipment: [90-90-55/420 Identifying ductwork](#) and [90-90-55/480 Mechanical plant and equipment identification labels generally](#).
 13. Testing: [Pr_65_65_25/785 Air leakage testing of medium-pressure ductwork](#) and [Pr_65_65_25/790 Air leakage testing of plant items](#).
 14. System completion: [Ss_65_40_33/820 Performance testing](#) and [Ss_65_40_33/840 Demonstrations](#).

System performance

Ss_65_40_33/210 Design of ventilation systems

1. Method: In accordance with [CIBSE Applications Manual AM 11](#). In accordance with [BS EN ISO 52016-1](#).
2. Requirement: Submit proposals including detailed design drawings, technical information regarding equipment models, calculations and manufacturers' literature.
3. Verification
 - 3.1. Submittals: Commissioning Certs
 - 3.2. Timing: Prior to Handover

Products

90-90-55/420 Identifying ductwork

1. Standard: To [BS 1710](#).
2. Identification type: Self-adhesive plastics or transfers.
3. Execution: [Pr_40_10_57/650 Installing ductwork identification](#).

See [90-90-55/480 Mechanical plant and equipment identification labels generally](#) in [Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems](#)

Pr_65_65_23_20 Duct access panels

1. Manufacturer: Contractor's choice
2. Material: Stainless steel.
3. Safety
 - 3.1. Screws: No self-tapping or piercing screws within one metre of an access opening in accordance with [BS EN 12097](#)

Pr_65_65_25_14 Circular sheet metal ductwork and fittings

1. Manufacturer: Contractor's choice
2. Standards: To [HVCA DW/144](#), [BS EN 1506](#) and [BS EN 12237](#).
3. Classification: Class A.
4. Air leakage testing: [Pr_65_65_25/785 Air leakage testing of medium-pressure ductwork](#) and [Pr_65_65_25/790 Air leakage testing of plant items](#).
5. Material: Zinc coated steel.
6. Construction: Spirally wound.
7. Regulating dampers
 - 7.1. Standard: As [HVCA DW/144](#).
 - 7.2. Balancing type: Single skin multi-blade damper.
 - 7.3. Operation: Manual.

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- 7.4. Material: To match ductwork.
 - 8. Flexible joint connections: Fit on fan inlets and outlets and at building expansion joints.
 - 9. Access openings
 - 9.1. Purpose: Inspection;
Cleaning;
and Maintenance.
 - 9.2. Sizes: To [HVCA DW/144](#), Appendix D and To [BS EN 12097](#).
 - 10. Execution: [Pr_65_65_25/610 Air ductwork generally](#);
[Pr_65_65_25/640 Installing sheet metal ductwork](#);
[Pr_65_65_25/740 Installing control equipment and instruments in metal ductwork](#);
[Pr_65_65_25/700 Test holes in ductwork](#);
[Pr_65_65_25/720 Weatherproofing ductwork penetrations](#);
[90-45-25/760 Ductwork cleanliness](#);
[90-45-25/770 Verification of cleanliness of ventilation systems](#);
and [90-45-25/655 Installing ductwork supports](#).

Pr_65_65_25_72 Rectangular sheet metal ductwork and fittings

- 1. Manufacturer: Contractor's choice
- 2. Standards: To B&ES [DW/144](#), [BS EN 1505](#) and [BS EN 1507](#).
- 3. Material: Stainless steel to [BS EN 10088-1](#).
- 4. Regulating dampers
 - 4.1. Standard: To B&ES [DW/144](#).
 - 4.2. Regulating function: Balancing.
 - 4.3. Damper type: Single skin multi-blade.
 - 4.4. Operation: Manual.
 - 4.5. Material: To match ductwork.
- 5. Access openings
 - 5.1. Purpose: Cleaning and Maintenance.
 - 5.2. Sizes: To [BS EN 12097](#).
- 6. Execution: [Pr_65_65_25/610 Air ductwork generally](#);
[Pr_65_65_25/640 Installing sheet metal ductwork](#);
[Pr_65_65_25/670 Ductwork support for vapour seal continuity](#);
[Pr_65_65_25/700 Test holes in ductwork](#);
and [Pr_65_65_25/720 Weatherproofing ductwork penetrations](#).

Pr_65_67_78_72 Rectangular attenuators

- 1. Description: Fan inlet and discharge attenuators and cross talk attenuators. Attenuators referenced in mechanical schedules.
- 2. Manufacturer: Noico
- 3. Application: Extract.
- 4. Performance standards: To [BS EN ISO 7235](#) and [BS EN ISO 11691](#).
- 5. Duty
 - 5.1. Insertion loss: Refer to Mechanical Schedule
 - 5.2. Air volume: Refer to Mechanical Schedule
 - 5.3. Permissible pressure loss: Refer to Mechanical Schedule
- 6. Lining material: Inert, fire proof, inorganic and non-hygroscopic.
- 7. Markings: Show direction of air flow on silencer.

See [Pr_80_77_27_15 Channel supports](#) in [Ss_55_70_38_15 Cold water supply systems](#)

Execution

90-45-25/655 Installing ductwork supports

1. Standard: In accordance with [HVCA DW/144](#).

90-45-25/760 Ductwork cleanliness

1. Cleaning: In accordance with [HVCA TR/19](#).
2. Level of protection: PD1.

90-45-25/770 Verification of cleanliness of ventilation systems

1. Verification: In accordance with [HVCA TR/19](#).
2. Method: Vacuum test.
3. Completion report: At Handover
 - 3.1. Format: Electronic and Paper copy.
 - 3.2. Submit: At handover.
 - 3.3. Number of copies: Two

See [Pr_40_10_57/611 Installing mechanical plant and equipment identification](#) in [Ss_50_30_04_97 Above-ground internal stack wastewater drainage systems](#)

Pr_40_10_57/650 Installing ductwork identification

1. Standard: In accordance with B&ES [DW/144](#).
2. Position: Locate where visible.
3. Direction of flow: Equilateral triangle, 150 mm length of side, with one apex pointing in the direction of flow.
4. Information: Space served by the duct and associated plant.

Pr_65_65_25/610 Air ductwork generally

1. Cut edges on ductwork, flanges and supports: Smooth and burr free.

Pr_65_65_25/640 Installing sheet metal ductwork

1. Standard: To B&ES [DW/144](#).
2. Hangers and supports: Install in accordance with [BSRIA BG 10/2010](#). Strength requirements to [BS EN 12236](#).
3. Installing flexible joint connections: Install fully stretched to minimize pressure drop.

Pr_65_65_25/670 Ductwork support for vapour seal continuity

1. Method of support: Ensure vapour seal is maintained throughout.

Pr_65_65_25/700 Test holes in ductwork

1. Position: In accordance with [CIBSE Commissioning Code Series A](#) and B&ES [DW/144](#).

Pr_65_65_25/720 Weatherproofing ductwork penetrations

1. Roof penetrations: Submit proposals
2. Wall penetrations: Submit proposals .

Pr_65_65_25/740 Installing control equipment and instruments in metal ductwork

1. General: Fit sensors, damper motors and other control equipment.
2. Connections: Connect control equipment and instruments.

Pr_65_65_25/785 Air leakage testing of medium-pressure ductwork

1. Standard: To [HVCA DW/144](#).
2. Extent: Random testing of 10% maximum of the ductwork system.
3. Test pressure: To [HVCA DW/144](#).
4. Documentation: Details of calculations used to arrive at the allowable loss for the section to be tested.
5. Report
 - 5.1. Format: Electronic and Paper copy.
 - 5.2. Submit: At handover.
 - 5.3. Number of copies: Two

Pr_65_65_25/790 Air leakage testing of plant items

1. Standard: To [HVCA DW/144](#).
2. Procedure: Include in-line plant with certificate of conformity for pressure class and air leakage classification for system under test.
3. Report
 - 3.1. Format: Electronic and Paper copy.
 - 3.2. Submit: At handover.
 - 3.3. Number of copies: Two

System completion

Ss_65_40_33/820 Performance testing

1. General: Demonstrate the performance of the installations.
2. Guaranteed efficiency: Tolerances defined in this specification.
3. Environmental tests: Carry out environmental testing. If necessary, use artificial loads to simulate operating conditions.
4. Reports: Submit on completion.

Ss_65_40_33/840 Demonstrations

1. Running of plant
 - 1.1. Operation: Run, maintain and supervise the installations under normal working conditions.
2. Instruction: Instruct and demonstrate the purpose, function and operation of the installations.

Ω End of System

Ss_70_30_25_25 **Earthing and bonding systems**

Systems

Ss_70_30_25_25 Earthing and bonding systems

1. **Description:** The Electrical Contractor shall be responsible for the design, supply, installation, connection, testing, commissioning, and setting to work of the complete and fully operational building earthing and bonding system installation.

The system shall facilitate for the transfer of electrical current to earth to protect personnel, buildings, structure, plant and equipment in the case of an electrical fault within the supply system and from interference from electro-magnetic fields and electrostatic forces.

The earthing and equipotential bonding system will provide protection against electric shock due to indirect contact by preventing the occurrence of a voltage of such magnitude and duration between simultaneously accessible conductive parts that danger could arise.

2. **System performance:** [Ss_70_30_25/220 Electricity distributor's requirements](#); [Ss_70_30_25/210 Design of earthing and bonding systems](#)
3. **Main protective bonding conductors:** [Pr_65_70_48_75 Single-core non-sheathed \(LHSF\) insulated cables type A](#)
4. **Supplementary bonding conductors:** [Pr_65_70_48_75 Single-core non-sheathed \(LHSF\) insulated cables type A](#)
5. **Circuit protective conductors:** Refer to cable schedules. Use cable armour and a core from the associated cable.
6. **Earth terminal type:** [Pr_65_70_46_24 Earth bars](#)
7. **Electrical identification:** [Pr_40_10_57_23 Electrical diagrams](#)
[Pr_40_10_57_29 Equipment labels and warning notices](#).
8. **Execution:** [Ss_70_30_25/630 General installation](#)
[Ss_70_30_25/640 Installing earth conductor joints and connections](#)
[Ss_70_30_25/660 Installing earthing conductor](#)
[Ss_70_30_25/670 Installing main protective bonding conductors](#)
[Ss_70_30_25/680 Installing supplementary bonding conductors](#)
[Ss_70_30_25/690 Dissimilar metals](#)
[Ss_70_30_25/720 Notices and labels](#)
[Ss_70_30_25/730 Installing functional earthing conductors](#).
9. **System completion:** [Ss_70_30_25/810 Inspection and testing](#)
[Ss_70_30_25/820 Documentation](#).

System performance

Ss_70_30_25/210 Design of earthing and bonding systems

1. **Standards:** In accordance with [BS 7671](#) and [BS 7430](#).
2. **Design:** Complete the design of the earthing and bonding systems.
3. **Requirement:** Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_70_30_25/220 Electricity distributor's requirements

1. **Evidence of compliance:** Submit, in accordance with the requirements of the Electricity Distributor.

Products

Pr_40_10_57_23 Electrical diagrams

Shared by: [Ss_80_50_60_26 Electric passenger and goods-passenger lift systems](#) ,
[Ss_70_80_33_35 Hardwired general lighting systems](#) , [Ss_70_30_45_45 Low-voltage distribution systems](#) and [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

1. **Description:** The contractor is responsible for incorporating all amendments to the contract drawings as instructed by the design team throughout the course of works. Upon completion, the contractor shall supply a full set of accurate 'As Built' drawings reflecting the works installed, for final submission and record.
2. **Material:** Paper print, encapsulated.
Digital.
3. **Format:** Single line engineering drawings to [BS EN 61082-1](#).
4. **Information to be included:**
 - Supply characteristics.
 - Maximum demand.
 - Cable types and sizes.
 - Switchgear ratings.
 - Protective device types, ratings and function.
 - Prospective fault current values at each item of switchgear.
 - Earth fault loop impedance values at each item of switchgear.
 - Circuits containing equipment vulnerable to testing.

Pr_40_10_57_29 Equipment labels and warning notices

Shared by: [Ss_70_80_33_35 Hardwired general lighting systems](#) , [Ss_70_30_45_45 Low-voltage distribution systems](#) and [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

1. **Manufacturer:** Submit proposals .
2. **Material:** Face engraved rigid plastic laminate.
3. **Label size:** Manufacturer's standard .
4. **Colour**
 - 4.1. **Background:** White.
 - 4.2. **Lettering:** Black.
5. **Typography**
 - 5.1. **Font:** Helvetica medium.
 - 5.2. **Size:** Manufacturer's standard .
6. **Notice wording:** Submit proposals .

Pr_65_70_46_24 Earth bars

1. **Manufacturer:** Submit proposals .
2. **Material**
 - 2.1. **Bar type:** Hard drawn copper to [BS EN 13601](#).
 - 2.2. **Finish:** Bare.
 - 2.3. **Support:** Manufacturer's standard .
3. **Size**
 - 3.1. **Profile:** 50 mm x 6 mm.
 - 3.2. **Length:** Submit proposals . To accept all connections identified on the schematics plus 50% spare.

-
4. Disconnecting links: 2.
 5. Execution: [Pr_65_70_46/610 Installing earth bars.](#)

Pr_65_70_48_75 Single-core non-sheathed (LSHF) insulated cables type A

1. Manufacturer: Submit proposals .
2. Standards: To [BS EN 50525-1](#) and [BS EN 50525-3-41](#).
3. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.
4. Cable type: H07Z-R.
5. Size: Refer to drawing / circuit chart.
6. Execution: [Pr_65_70_48/635 Installing low-voltage cables.](#)

Execution

Pr_65_70_46/610 Installing earth bars

1. Main earth bar location: Next to the incoming electricity point of supply.
2. Mounting

Pr_65_70_48/635 Installing low-voltage cables

Shared by: [Pr_65_70_48_88 Thermosetting insulated armoured fire-resistant low-smoke halogen-free \(LSHF\) cables](#) , [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#) , [Pr_65_70_48_29 Fire-resistant screened \(LSHF\) cables](#) , [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables Type A](#) and [Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed \(LSHF\) cables](#)

1. Standard: In accordance with [BS 7671](#).
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Preparation: Store cables above 5°C for 24 hours before installation.
Clear cable path of debris.
4. Installation temperature (minimum): 5°C.
5. Cables: Install in one length. Dress cables flat, free from twists, kinks and strain.
6. Cable pulling: Do not overstress. Prevent kinks and twisting of the cable.
7. Cable protection: Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. Concealed cable runs to wall accessories: Run vertically from the accessory.
9. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.
10. Jointing and termination
 - 10.1. Final circuit cables: At electrical accessories only.
 - 10.2. Core connections: Using compression lugs to equipment without integral clamping terminals.
 - 10.3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Ss_70_30_25/630 General installation

1. Standards: In accordance with [BS 7430](#) and [BS 7671](#).

Ss_70_30_25/640 Installing earth conductor joints and connections

1. Number of joints: Minimize.

-
2. Contact surfaces: Clean. Coat with corrosion inhibitor.
 3. Bimetallic joints: Do not cross-contaminate.
 4. Protection to joints and connections: Apply heat shrink clear sheathing.
 5. Connections to test points: Clamp.

Ss_70_30_25/660 Installing earthing conductor

1. Connection to earth electrodes: Heavy duty copper alloy mechanical clamps.

Ss_70_30_25/670 Installing main protective bonding conductors

1. Separate and continuous connections: Install between each service and the main earth terminal.
2. Bonding connections at main earth terminal: Connect with compression lugs and phosphor bronze nuts and bolts and spring washers.

Ss_70_30_25/680 Installing supplementary bonding conductors

1. Earth connections: Connect with compression lugs.

Ss_70_30_25/690 Dissimilar metals

1. Connecting dissimilar metals: Prevent electrolytic action.

Ss_70_30_25/720 Notices and labels

1. Earth bars: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
2. Earthing and main protective bonding connections: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
3. Supplementary bonding connections: Describe each connection and label with 'SAFETY ELECTRICAL CONNECTION – DO NOT REMOVE'.
4. Telecommunications functional earth connections: Label with 'TELECOMMS EARTH – DO NOT REMOVE'.
5. Earth free locations: For areas utilizing protection by earth-free local equipotential bonding label with 'THE PROTECTIVE BONDING CONDUCTORS ASSOCIATED WITH THE ELECTRICAL INSTALLATION IN THIS LOCATION MUST NOT BE CONNECTED TO EARTH – EQUIPMENT HAVING EXPOSED-CONDUCTIVE-PARTS CONNECTED TO EARTH MUST NOT BE BROUGHT INTO THIS LOCATION'.

Ss_70_30_25/730 Installing functional earthing conductors

1. Standards: To [BS 6701](#) and in accordance with [BS 7671](#).

System completion

Ss_70_30_25/810 Inspection and testing

1. Standards: In accordance with [BS 7430](#) and [BS 7671](#).
2. Notice before commencing tests (minimum): 5 Working Days.
3. Continuity of protective conductors
 - 3.1. Parallel earth paths: Isolate before testing.
 - 3.2. Equipment: Continuity tester with short circuit current not less than 200 mA, and a no load d.c. or a.c. voltage between 4 V and 24 V.
4. External earth fault loop impedance (Z_e): Direct measurement.
5. Earth fault loop impedance (Z_s): Direct measurement.

Ss_70_30_25/820 Documentation

1. Operating and maintenance instructions
 - 1.1. Scope: Submit for the system giving optimum settings for controls.
 - 1.2. Format: A4 Paper and Electronic copies.
 - 1.3. Number of copies: Two.
2. Record drawings
 - 2.1. Content: Location and arrangement of plant in plant rooms and Location of earth terminals.
 - 2.2. Format: Electronic drawing.
3. Submittal date: At handover.

Ω End of System

Ss_70_30_25_45 **Lightning protection systems**

Systems

Ss_70_30_25_45 Lightning protection systems

1. Description: Contractor is to inspect and verify the existing lightning protection system.
Ω End of System

Ss_70_30_45_40 Low-voltage site connection systems

Systems

Ss_70_30_45_40 Low-voltage site connection systems

1. **Description:** Due to the historical significance of all the building spaces within this development, any alterations that must be made to the historical fabric must be agreed upon with HRP's historical/archaeology team.

The existing incoming connection is at Moat Level outside of the main scope of the plans but clearly identified on 313293-HAH-01-UB-D-E-06101.

At present there are 2no. 200A incoming supplies within the containing cupboard. It is anticipated that only one of these supplies will be required to service the new arrangement.

The supplies should be inspected to confirm their suitability for continued service. Once this has been confirmed, the supply to the Kitchen Services can be entirely isolated. The contractor should then rationalize the existing busbar arrangement to suit the intended arrangement as shown on the LV schematic 313293-HAH-01-XX-D-E-06002.

Please note that all existing isolators associated with the existing busbar arrangement are to be verified and where these are found to be serving areas besides those shown in scope on the plans- they are to be retained.

The contractor shall then procure, install, set to work and commission a cable connection to the new distributions boards from the existing main busbar. Refer to LV schematic for further detail.

2. System performance: [Ss_70_30_45/220 Supply characteristics](#)
3. Nature of current: Alternating.
4. Phase: Three phase 4 wire. Single phase 2 wire.
5. Voltage: 400 V. 230 V.
6. Electricity distributor: UK Power Networks.
7. Execution: [Ss_70_30_45/610 Removing and permanent isolation of incoming low-voltage electricity supply Type A](#); [Ss_70_30_45/640 Location of incoming point of supply](#)
[Ss_70_30_45/660 Earthing arrangement](#)
8. System completion: [Ss_70_30_45/830 Documentation](#)

System performance

Ss_70_30_45/220 Supply characteristics

1. Anticipated maximum demand (kV·A): 50
2. Earthing type: TN-S
3. Maximum prospective short circuit current: To be determined by the contractor.
4. Maximum external earth fault loop impedance: To be determined by the contractor.
5. Overcurrent device at incoming point of supply
 - 5.1. Type: Fuse to [BS EN 60269-1](#) and [BS HD 60269-2](#).
 - 5.2. Rating: 200A TPN
6. Verification: Contractor to test and verify the incoming supply

Execution

Ss_70_30_45/610 Removing and permanent isolation of incoming low-voltage electricity supply Type A

1. **Scope:** Investigate cabling and confirm extent of installation to be stripped-out.
2. **Low-voltage supply:** Investigate the Low-Voltage supply and confirm its suitability for continued use.
3. **Point of isolation:** To be verified.

Ss_70_30_45/640 Location of incoming point of supply

1. **Incoming point of supply:** As detailed on drawings and schematics.

Ss_70_30_45/660 Earthing arrangement

1. **Incoming earthing arrangement:** Establish with the Electricity Distributor.

System completion

Ss_70_30_45/830 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** A4 Paper copy and Electronic copy.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** For all low voltage distribution circuits, the cable origin at the site boundary, route to service cut out, method of installation, depth of trench, details of ducts including sizes and position of cable joints.
 - 2.2. **Drawing format:** Electronic drawing.
3. **Submittal date:** At handover.

Ω End of System

Ss_70_30_45_45 Low-voltage distribution systems

Systems

Ss_70_30_45_45 Low-voltage distribution systems

1. **Description:** The Low Voltage (LV) distribution system has been designed to provide safe, efficient, and reliable power distribution for lighting, small power, and mechanical services across the facility. The system is to be coordinated in accordance with BS 7671 (IET Wiring Regulations), relevant IEC standards, and best engineering practices. All switchgear and distribution equipment shall be manufactured by Schneider Electric, ensuring quality, compatibility, and ease of maintenance throughout the installation. The Electrical Contractor shall be responsible for the procurement, installation, connection, setting to work and commissioning of a complete and fully operational low voltage electrical distribution system throughout the refurbished building including automatic disconnection of overloading circuits or faulty equipment to protect against electric shock.

The low voltage distribution system shall include supplies to/from distribution board and provision of other equipment/switchgear for distribution of low voltage electricity to the points of utilisation within the spaces. Please refer to the LV schematic 313293-HAH-01-XX-D-E-06002 for further details.

The contractor shall aim to hide the cable routes to their best ability, avoiding causing damage to the historical fabric.

Any new builders work holes or other penetrations required will be required to be validated with HRP and the construction team. Purcell are providing guidance on the historical architecture.

All electrically conductive containment systems shall be electrically continuous and treated/painted where exposed to the detrimental elements.

Where cables and cable containment systems pass through a wall, constituting separate fire compartments, the penetration shall be sealed after cable installation using a proprietary, intumescent non-shrinking fire stopping method. The method shall provide a fire resistance at least equal to the rating of the entire wall and shall provide an easy method of breakthrough and resealing to allow future installation of more cables if necessary. Please refer to the fire engineers drawings which illustrate the fire compartmentation in the building.

Protection devices across the system are to be coordinated to ensure appropriate discrimination and fault clearance in accordance with time/current characteristics. All boards to be provided with a circuit chart, schedule, and single-line diagram affixed internally.

2. **System performance:** [Ss_70_30_45/215 Low-voltage distribution circuit cables generally](#)
[Ss_70_30_45/221 Conduit, trunking and ducting generally](#)
3. **Connection to low-voltage supply:** Refer to Electrical schematic drawing and schedules
4. **Switchgear:** [Pr_60_70_22_22 Distribution boards DB-1 and DB-2 Small Power and Lighting;](#)
[Pr_60_70_22_22 Distribution board DB-M Mechanical;](#) [Pr_60_70_22_19 Low Voltage Panelboard PB-1;](#) [Pr_60_70_22_22 Distribution boards Small Power and Lighting DB-Arches and DB-Ramp](#)
5. **Protective devices :** [Pr_65_72_27_52 Miniature circuit breakers](#)
[Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection](#)
6. **Distribution circuit cabling:** [Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed \(LSHF\) armoured cables](#)
[Pr_65_70_48_29 Fire-resistant screened \(LSHF\) cables](#)
[Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables Type A](#)
[Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed \(LSHF\) cables](#)

7. Cable accessories:

[90-55-10/320 Cable bands](#)
[Pr_65_70_11_15 Cable ties](#)

8. Containment: [Pr_65_70_11_71 Rigid conduit type A](#);

9. Monitoring and metering: [Pr_80_51_51_23 Digital multifunction metering equipment](#)

10. Power conditioning equipment: [Pr_65_72_27_50 Mains power supply transient overvoltage suppression devices](#)

11. Electrical identification: [Pr_40_10_57_29 Equipment labels and warning notices](#)
[Pr_40_10_57_23 Electrical diagrams](#).

12. Execution:

[Ss_70_30_45/625 Installing low-voltage distribution systems](#)
[Ss_70_30_45/650 Connection to the incoming supply](#); [Ss_70_30_45/621 Alterations to existing busbar trunking](#)

13. System completion: [Ss_70_30_45/821 Documentation](#)

System performance

Ss_70_30_45/215 Low-voltage distribution circuit cables generally

1. Proposed selection of low-voltage distribution cables: Refer to drawing, schematics and schedules
2. Conductor sizes (minimum): Refer to Project Circuit Charts and Refer to Schematics.
3. Cable sizes not stated: Refer to the engineer.

Ss_70_30_45/221 Conduit, trunking and ducting generally

1. Standard: In accordance with [BS 7671](#).
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Conduit, trunking and ducting sizes not stated: Submit.

Products

90-55-10/320 Cable bands

Shared by: [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#) and [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

1. Manufacturer: Contractor's choice .
2. Format: Perforated metal bands.
 - 2.1. Material: Steel.
 - 2.2. Protective covering: LSHF.

See [Pr_40_10_57_23 Electrical diagrams](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

See [Pr_40_10_57_29 Equipment labels and warning notices](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

Pr_60_70_22_19 Low Voltage Panelboard PB-1

1. Description: To serve as the primary distribution point for the electrical installation inside the main Reveller building.

Schneider Powerpact 4 MG2C9

-
2. Manufacturer: Schneider
 3. Standards: To [BS EN IEC 61439-1](#) and [BS EN IEC 61439-2](#).
 4. Third-party certification: [ASTA Type test certification](#).
 5. External design type: Wall-mounted surface.
 6. Rated operational voltage (Ue): 415 V a.c..
 7. Incoming device: Low-voltage switch-disconnectors.
 8. Outgoing devices
 - 8.1. Type: Moulded case circuit breakers.
 - 8.2. Quantity: Refer to the LV schematic.
 9. Busbar and connections
 - 9.1. Rated current (InA): 250A
 - 9.2. Rated short-time withstand current (Icw): 36 kA for one second.
 10. Spare ways: As circuit schedules. Fit with blank plates.
 11. Enclosure
 - 11.1. Ingress protection (minimum): To [BS EN 60529](#), IP31.
 - 11.2. Material: Low-carbon sheet steel.
 - 11.3. Finish: Externally polyester powder-coated.
 - 11.4. Locking mechanism: Lockable by key
 12. Internal separation: Form 3b Type 2.
 13. Cable entry: Entry via gland plates facilitating either top and/or bottom entry.
 14. Mounting arrangement for Electricity Distributor's metering equipment: Separate.
 15. Accessories: Digital metering equipment extension with meters fitted as per the LV schematic. MG6CEX.

Padlocks and keys.
 16. Execution: [Pr_60_70_22/665 Installing low-voltage switchgear generally](#); [Pr_60_70_22/676 Circuit schedules](#)

Pr_60_70_22_22 Distribution board DB-M Mechanical

1. Description: A dedicated Schneider Electric distribution board shall be provided to serve mechanical loads such as fans, pumps, heat pumps, water heaters, air handling units, and other mechanical equipment.

Schneider SEA9BPN24

24 Way Type B Distribution Board
2. Manufacturer: Schneider
3. Standards: To [BS EN IEC 61439-1](#) and [BS EN 61439-3](#).
4. Third-party certification: [ASTA Type test certification](#).
5. Rated operational voltage (Ue): 415 V a.c.
6. Incoming device: Low-voltage switch-disconnectors.
7. Outgoing devices
 - 7.1. Type: Miniature circuit breakers. Residual current circuit breakers with integral overcurrent protection. Arc Fault Detection Devices.
8. Busbars and connections
 - 8.1. Type: Fully shrouded.
 - 8.2. Rated current (InA): 250 A.

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- 8.3. Rated short-time withstand current (I_{cw}): 25 kA for one second.
 - 9. Neutral and earth bars: Individual terminal for each outgoing circuit.
 - 10. Neutral terminations: Match current carrying capacity of phase conductor.
 - 11. Spare ways: As circuit schedules.
 - 12. Enclosure
 - 12.1. Ingress protection (minimum): To [BS EN 60529](#), IP31.
 - 12.2. Material: Low-carbon sheet steel.
 - 12.3. Finish: Polyester powder-coated.
 - 12.4. Locking mechanism: Cylinder locks with a standard key type.
 - 13. Accessories: Digital metering equipment. Padlocks and keys.
 - 14. Execution: [Pr_60_70_22/665 Installing low-voltage switchgear generally](#); [Pr_60_70_22/676 Circuit schedules](#)

Pr_60_70_22_22 Distribution boards DB-1 and DB-2 Small Power and Lighting

- 1. Description: SEA9BPN2506T8S4S4

Schneider split meter board inc. AFDD enclosure.
- 2. Manufacturer: Schneider
- 3. Standards: To [BS EN 61439-1](#) and [BS EN 61439-3](#).
- 4. Third-party certification: [ASTA Type test certification](#).
- 5. Rated operational voltage (U_e): 415 V and 600 V.
- 6. Incoming device: [Pr_60_70_48_47 Low-voltage switch-disconnectors](#).
- 7. Outgoing devices
 - 7.1. Type: As Circuit schedules.
 - 7.2. Quantity: As Circuit schedules and Full Compliment.
- 8. Busbars and connections
 - 8.1. Type: Fully shrouded.
 - 8.2. Rated operational current (I_e): Manufacturer's standard .
 - 8.3. Rated short-time withstand current (I_{cw}) for 1 s: 25 kA.
- 9. Neutral and earth bars: Individual terminal for each outgoing circuit. Two separate earth bars.
- 10. Neutral terminations: Match current carrying capacity of phase conductor.
- 11. Spare ways: 25%.
- 12. Enclosure
 - 12.1. Ingress protection (minimum): Manufacturer's standard .
 - 12.2. Material: Steel.
 - 12.3. Finish: Polyester powder coated.
 - 12.4. Colour: Manufacturer's standard .
 - 12.5. Locking mechanism: Cylinder locks with a standard key type.
- 13. Accessories: Manufacturer's standard .
- 14. Execution: Installing distribution boards.

Pr_60_70_22_22 Distribution boards Small Power and Lighting DB-Arches and DB-Ramp

1. Description: SEA9BPN4
4 Way Type B TPN Board
2. Manufacturer: Schneider
3. Standards: To [BS EN IEC 61439-1](#) and [BS EN 61439-3](#).
4. Third-party certification: [ASTA Type test certification](#).
5. Rated operational voltage (Ue): 415 V a.c.
6. Incoming device: Low-voltage switch-disconnectors.
7. Outgoing devices
 - 7.1. Type: Miniature circuit breakers.
8. Busbars and connections
 - 8.1. Type: Fully shrouded.
 - 8.2. Rated current (InA): 250 A.
 - 8.3. Rated short-time withstand current (Icw): 25 kA for one second.
9. Neutral and earth bars: Individual terminal for each outgoing circuit.
10. Neutral terminations: Match current carrying capacity of phase conductor.
11. Spare ways: As circuit schedules. Fit with blank plates.
12. Enclosure
 - 12.1. Ingress protection (minimum): To [BS EN 60529](#), IP31.
 - 12.2. Material: Low-carbon sheet steel.
 - 12.3. Finish: Polyester powder-coated.
 - 12.4. Locking mechanism: Cylinder locks with a standard key type.
13. Accessories: Digital metering equipment. Padlocks and keys.
14. Execution: [Pr_60_70_22/665 Installing low-voltage switchgear generally](#); [Pr_60_70_22/676 Circuit schedules](#)

Pr_60_70_48_47 Low-voltage switch-disconnectors

1. Manufacturer: Schneider
2. Standards: To [BS EN 60947-1](#) and [BS EN 60947-3](#).
3. Third-party certification: [ASTA Type test certification](#).

Pr_65_70_11_13 Cable cleats

Shared by: [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#)

1. Manufacturer: Contractor's choice .
2. Standard: To [BS EN 61914](#).
3. Format: Contractor's choice .
4. Material: None ferrous metallic.
5. Resistance to impact: Medium.
6. Environmental influences
 - 6.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 6.2. Metallic and composite components: High resistance to corrosion.

Pr_65_70_11_15 Cable ties

Shared by: [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#) and [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

1. Standard: To [BS EN 62275](#).
2. Format: Wrap around self-locking releasable.
3. Material: Metal.
4. Contribution to fire : Non-flame propagating.
5. Environmental influences
 - 5.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 5.2. Metallic and composite components: Resistant to corrosion.

Pr_65_70_11_71 Rigid conduit type A

Shared by: [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#) and [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

1. Manufacturer: Contractor's choice .
2. Standards: To [BS EN 61386-21](#).
3. Material: Metallic.
4. Mechanical properties
 - 4.1. Resistance to compression: Medium.
 - 4.2. Resistance to impact: Medium.
5. Resistance to bending: Rigid.
6. Ingress protection (minimum): To [BS EN 60529](#), IP x4.
7. Tensile strength: Medium.
8. Suspended load capacity: Medium.
9. Sizes (OD): Contractor's choice .
10. Execution: [Pr_65_70_11/765 Conduit, trunking and ducting zones](#); [Pr_65_70_11/735 Installing conduit connections to equipment](#); [Pr_65_70_11/721 Installing rigid metallic conduit](#)

Pr_65_70_48_29 Fire-resistant screened (LSHF) cables

Shared by: [Ss_70_30_80_35 Hardwired low-voltage small power systems](#) and [Ss_75_50_11_27 Emergency voice communication systems](#)

1. Standard: To [BS 7629-1](#).
2. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified and Loss Prevention Certification Board ([LPCB](#)) certified.
3. Size: Refer to design drawings DB charts and schedules
4. Fire resistance category: ENHANCED 120.
5. Screen: Aluminium tape.
6. Execution: [Pr_65_70_48/635 Installing low-voltage cables](#) and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#).

Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables Type A

1. Manufacturer: Prysmian LSX
2. Standard: To [BS 8436](#).
3. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.

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4. Size: Refer to schematics and schedules
 5. Sheath colour: Black.
 6. Execution: [Pr_65_70_48/635 Installing low-voltage cables](#) and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#).

Pr_65_70_48_90 Thermosetting-insulated and thermoplastic-sheathed (LSHF) armoured cables

1. Standard: To [BS 6724](#).
2. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.
3. Size: Refer to Drawing / circuit charts and schedules
4. Insulation: Manufacturer's standard .
5. Sheath colour: Black.
6. Execution: [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#).

Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables

1. Standard: To [BS 7211](#).
2. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.
3. Cable type: Manufacturer's standard .
4. Size: Refer to circuit charts and Refer to Schematics.
5. Execution: [Pr_65_70_48/635 Installing low-voltage cables](#) and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#).

Pr_65_72_27_50 Mains power supply transient overvoltage suppression devices

1. Manufacturer: Schneider Electric
2. Standard: To [BS EN 61643-11](#), type 1 and To [BS EN 61643-11](#), type 2.
3. Number of poles: SPN
4. Execution: [Pr_65_72_27/610 Installing surge protective devices for low voltage power supplies](#).

Pr_65_72_27_52 Miniature circuit breakers

1. Manufacturer: [Schneider Electric Ltd](#)
2. Contact details
 - 2.1. Address: Stafford Park 5
Telford
Shropshire
TF3 3BL
 - 2.2. Telephone: [+44 \(0\)870 608 8608](#)
 - 2.3. Web: [www.schneider-electric.com/uk](#)
 - 2.4. Email: [tom.gillam@se.com](#)
3. Standards: To [BS EN 60898-1](#).

Pr_65_72_27_73 Residual current circuit breakers with integral overcurrent protection

1. Manufacturer: [Schneider Electric Ltd](#)
2. Contact details

-
- 2.1. Address: Stafford Park 5
Telford
Shropshire
TF3 3BL
- 2.2. Telephone: +44 (0)870 608 8608
- 2.3. Web: www.schneider-electric.com/uk
- 2.4. Email: tom.gillam@se.com
3. Standards: To BS EN 61009-1.

Pr_80_51_51_23 Digital multifunction metering equipment

1. **Description:** Energy meters shall be provided with full Modbus communication capability for integration with the Building Management System (BMS). All metering devices shall be Schneider Electric models from the PM5000 and iEM3000 series, or approved equivalent. Meters shall be installed and configured to provide remote monitoring of electrical parameters via Modbus RTU or Modbus TCP/IP, as appropriate to the site infrastructure.

All energy meters shall be DIN-rail or panel-mounted digital multi-function meters, factory-configured to support Modbus communication.

Meters shall be Schneider Electric:

PM5000 series for main incoming and sub-main panels (Class 0.5S accuracy or better).

iEM3000 series for local sub-circuit monitoring (Class 1.0 or better).

Meters shall be capable of measuring and reporting:

Voltage (line-line and line-neutral)

Current per phase

Frequency

Active, reactive, and apparent power (kW, kVAR, kVA)

Power factor

Total and partial energy (kWh)

Demand (power and current)

Total harmonic distortion (where supported)

All meters shall communicate with the BMS via the Modbus protocol:

Modbus RTU (RS-485) for serial communication

Modbus TCP/IP where Ethernet connectivity is provided

The Modbus network shall be wired in a daisy-chain topology for RS-485, with appropriate end-of-line termination resistors.

All meters shall be configured with unique Modbus slave addresses and matching communication settings (baud rate, parity, stop bits).

If using Modbus RTU, a gateway (e.g., Schneider EGX150 or Com'X) shall be provided to interface with the BMS over IP.

The BMS shall poll meters at defined intervals (typically 10–60 seconds) and record all relevant data points.

Data from the meters shall be mapped into the BMS using the manufacturer's Modbus register maps (Schneider Electric PM5000/iEM3000 series).

The BMS shall provide:

Real-time display of metered values

Data logging and trending (minimum 30 days storage)

Alarming on user-defined thresholds (e.g. high demand, low power factor)

Export of energy data for reporting (CSV, PDF or BACnet/IP)

Meters shall be installed in accordance with manufacturer recommendations, including CT orientation, burden limits, and wiring practices.

All communication cabling shall be shielded twisted pair (minimum 1.5 mm²), installed away from high-voltage power cabling to prevent interference.

Commissioning shall include:

Verification of Modbus connectivity and addressability

Confirmation of correct register mapping to BMS
Testing of alarm thresholds and real-time data updates
Functional test reports to be submitted prior to handover

The contractor shall provide:
Full register mapping sheets for each meter
As-built communication wiring diagrams
Meter configuration files (where applicable)
Manufacturer datasheets and manuals

2. Manufacturer: [Schneider Electric Ltd](#)
3. Contact details
 - 3.1. Address: Stafford Park 5
Telford
Shropshire
TF3 3BL
 - 3.2. Telephone: [+44 \(0\)870 608 8608](tel:+4418706088608)
 - 3.3. Web: www.schneider-electric.com/uk
 - 3.4. Email: tom.gillam@se.com
4. Display type: Liquid crystal display (LCD).
5. Metering functions: Active energy (kWh);
Active power (kW);
Apparent power (kVA);
Frequency (Hz);
Maximum active power demand (kW);
Phase currents (A);
Power factor;
and Voltage between phases (V).
6. Mounting: Recessed into switchgear in located identified on the schematic.
7. Execution: [Pr_80_51_51/620 Installing electrical monitoring and metering equipment.](#)

Execution

Pr_60_70_22/665 Installing low-voltage switchgear generally

1. General requirements: [Pr_60_70_22/675 Labelling low-voltage switchgear](#)
2. Switchgear cubicles: Arrange in modular form to facilitate future extension.
3. Clearance (minimum)
4. Fixing equipment
 - 4.1. Generally: Fix independently of wiring installation with zinc electroplated fasteners.
 - 4.2. Indoor equipment: Fix using internal lugs.
 - 4.3. Outdoor equipment: Fix using external lugs.
5. Orientation: Accurate and square to vertical and horizontal axes. Align adjacent items of switchgear on the same horizontal axis.
6. Extension boxes: Provide where necessary.
7. Gland plates: Non-ferrous for single core cables.
8. Identification
 - 8.1. Neutral and earth bar terminals: Label with the outgoing circuit reference.
 - 8.2. Cable terminations: Label with circuit reference, with push-on plastics markers.

Pr_60_70_22/675 Labelling low-voltage switchgear

1. Switchgear terminals: To [BS EN IEC 60445](#).

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2. Fuses, terminal blocks and other assembly components: Label describing their purpose.
 3. Spare fuses: Label, describe their rating and associated outgoing ways.

Pr_60_70_22/676 Circuit schedules

1. Circuit schedules: Include an A4-sized typed circuit schedule within a clear plastic wallet, securely fixed to the inside cover of each cubicle switchboard and distribution board. The circuit schedule is to include a description of each outgoing circuit, its circuit reference number, the rating of the circuit breaker or fuse and the size and type of cable.

Pr_65_70_11/700 Installing conduit, trunking and ducting

1. Standards: To [BS 7671](#) and in accordance with [IET Guidance Note 1](#).
2. Preparation: Cut square. Remove burrs and sharp edges to make smooth.
3. Protection of metallic conduit, trunking and ducting
 - 3.1. Joints and ends: Remove grease, oil, dirt and rust before applying protective paint. Paint immediately following installation.
 - 3.2. Protective paint
 - 3.2.1. Generally: Compatible with conduit, trunking and ducting finish.
 - 3.2.2. Type: Match factory finish.
4. Cross-sectional area: Maintain throughout the conduit, trunking and ducting length.
5. Arrangement: Position vertically and horizontally in line with equipment served, and parallel with building lines.
6. Distance from other services running parallel (minimum)
 - 6.1. Generally: 150 mm.
 - 6.2. Above radiators: 1000 mm.
7. Drainage of conduit, trunking and ducting: Locate drainage outlets at lowest points in conduit, trunking and ducting installed externally, and where condensation may occur.
8. Fire barriers: Provide to maintain integrity of fire compartments.
9. Rewireable installations: Enable rewiring from accessible boxes or accessories only.
10. Support: Independently fix and support conduit, trunking and ducting from building structure.
11. Cleaning: Clean insides of conduit, trunking and ducting before installing cables.
12. Cabling: Install when conduit, trunking and ducting enclosure is complete.
13. Submittals: Submit manufacturer's technical information. Submit drawings showing the proposed routes of conduit, trunking and ducting and the location of service outlets.

Pr_65_70_11/721 Installing rigid metallic conduit

1. General requirements: [Pr_65_70_11/700 Installing conduit, trunking and ducting](#)
2. Joints: Screwed.
3. Threaded conduits: Tightly screw to ensure electrical continuity, with no thread showing.
4. Conduit connections to boxes and items of equipment, other than those with threaded entries: Earthing coupling with male brass bush and protective conductor.

Pr_65_70_11/735 Installing conduit connections to equipment

1. General requirements: [Pr_65_70_11/700 Installing conduit, trunking and ducting](#)
2. Surface-mounted equipment
 - 2.1. Concealed conduit: Conceal the final connection.
 - 2.2. Exposed conduit: Contain the final connection from the conduit box within flexible metal conduit.

3. Equipment subject to vibration: Flexible metal conduit of adequate length to facilitate removal of equipment for maintenance. Final termination in swivel connectors.
4. Connections to external equipment: Flexible conduit.

Pr_65_70_11/765 Conduit, trunking and ducting zones

1. General requirements: [Pr_65_70_11/700 Installing conduit, trunking and ducting](#) .
2. Ceiling voids: Provide clear distance of 150 mm (minimum) between underside of any conduit, trunking or trunking and the topside of ceiling.
 - 2.1. Clear distance between underside of conduit, trunking and ducting and topside of ceiling (minimum): 150 mm.

See [Pr_65_70_48/635 Installing low-voltage cables](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket

Shared by: [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#)

1. Cabling: Install when cable supports are complete.
2. Position: Place single and multi-core cables side by side.
3. Fastening
 - 3.1. Fastenings generally: Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed. Cleat all cables on riser sections.
 - 3.2. Submain cables <95 mm²: [90-55-10/320 Cable bands](#). Cleat for riser sections
 - 3.2.1.Spacing (maximum): 600 mm.
 - 3.3. Submain cables >95 mm²: [Pr_65_70_11_13 Cable cleats](#).
 - 3.3.1.Spacing (maximum): 600 mm.
 - 3.4. Final circuit cabling: [Pr_65_70_11_15 Cable ties](#).
 - 3.4.1.Spacing (maximum): 600 mm.
 - 3.5. Extra-low-voltage, communications and fibre-optic cabling: [Pr_65_70_11_15 Cable ties](#).
 - 3.5.1.Spacing (maximum): 600 mm.

Pr_65_72_27/610 Installing surge protective devices for low voltage power supplies

1. Standards: In accordance with [BS 7671](#) and [DD CLC/TS 61643-12](#).
2. Point of installation: At Distribution Board
3. Mounting arrangement: Din Rail
4. Connection arrangement: In series with the main circuit current carrying path.
5. Interconnecting cable
 - 5.1. Cable type: Device manufacturer's standard.
 - 5.2. Cable size: Device manufacturer's standard.
 - 5.3. Cable length (maximum): 500 mm.
 - 5.4. Cable installation: Tightly bind connecting leads together.

Pr_80_51_51/620 Installing electrical monitoring and metering equipment

1. Standard: In accordance with [BS 7671](#).
2. Digital metering equipment: Connect to building management system.

Ss_70_30_45/621 Alterations to existing busbar trunking

1. **Standards:** In accordance with type test certification.
2. **Records:** Submit.

Ss_70_30_45/625 Installing low-voltage distribution systems

1. **Standard:** In accordance with [BS 7671](#).
2. **Layout:** Position cabling and equipment to provide safe and easy access for operation and maintenance.

Ss_70_30_45/650 Connection to the incoming supply

1. **Customer's installation:** Liaise with DNO and Clients energy provider for meter installation.

System completion

Ss_70_30_45/821 Documentation

1. **Operating and maintenance instructions**
 - 1.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 1.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. **Format:** Paper and Electronic.
 - 1.4. **Number of copies:** Two.
2. **Record drawings**
 - 2.1. **Content:** For all low voltage distribution circuits: the cable origin, circuit designation, route, loading, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in trunking and conduit;
Location, route and depth of underground cables;
Location of LV switchgear including distribution boards;
Routes of trunking, conduit, cable tray and cable ladders;
and Schematic drawings showing all low voltage distribution circuits: the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device.
 - 2.2. **Drawing format:** Electronic drawing.
3. **Submittal date:** At handover.

Ω End of System

Ss_70_30_80_35

Hardwired low-voltage small power systems

Systems

Ss_70_30_80_35 Hardwired low-voltage small power systems

1. **Description:** The small power installation throughout the building includes 13A twin switched socket outlets, switched fused connection units (SFCUs), rotary isolators, and dedicated supplies to specialist equipment such as mechanical plant, automatic doors, disabled toilet alarm systems, and an evacuation lift with dual supply via an automatic transfer switch (ATS). All works shall be undertaken in accordance with the latest edition of the IET Wiring Regulations (BS 7671:2018+A2:2022), the Building Regulations including Approved Document M, and other relevant standards such as BS 8300, BS EN 60947, BS 8519, and BS EN 60670.

Cabling for all small power circuits shall be installed using Flexishield (or equivalent low smoke zero halogen, armoured cabling) and shall be routed along ceiling-mounted galvanised steel cable trays, securely fixed to the building structure. Vertical drops to outlets shall be made using steel mini trunking, conduit, or chased within walls where permitted, with adequate mechanical protection. All cable penetrations through fire-resisting barriers shall be sealed using tested fire-stopping systems in accordance with BS EN 1366-3.

All socket outlets shall be 13A twin switched and installed in accordance with Part M of the Building Regulations and BS 8300, typically mounted between 400mm and 1200mm above finished floor level, depending on the use and occupancy of the space. Socket outlets shall be metalclad in plant areas or locations requiring enhanced durability. General use circuits shall be provided with individual RCBO protection at the distribution board to meet the requirements of Regulation 411.3.3 of BS 7671, providing both overload and residual current protection. Final circuits not exceeding 32A supplying socket outlets or fixed equipment shall be protected by a 30mA RCD in accordance with Regulation 411.3.3 and 411.3.4, unless exempt by specific installation method or use.

Switched fused connection units (SFCUs) shall be installed for fixed appliances and mechanical services equipment such as extract fans, door operators, and local water heaters. These units shall be metalclad where appropriate and labelled to identify the connected load. Circuit protection shall be via RCBOs or MCBs with upstream RCD protection as applicable. Rotary isolators shall be provided locally for heavy duty mechanical plant and equipment, installed within line of sight of the plant, lockable in the OFF position, and sized to suit the load current of the connected equipment.

Power supplies to automatic doors shall be provided via dedicated SFCUs on final circuits, with allowance for control wiring as required by the door automation system. Disabled toilet facilities shall include permanent power to alarm and assistance systems, including a pull-cord alarm with audible/visual indicators and a reset facility, compliant with BS 8300. Alarm units shall have integral battery backup and interface with the BMS where required to provide remote alert or fault indication.

The evacuation lift shall be served via a dedicated supply from the main Panelboard, protected by MCCB and installed in fire-resistant cabling compliant with BS 8519 and BS 5839-1. A secondary supply shall be derived from the origin and connected via an automatic transfer switch (ATS) compliant with BS EN 60947-6-1. Both supply paths shall originate from the same source of earthing and shall be clearly labelled and segregated as per Regulation 560.7 of BS 7671. The lift system shall also integrate with the building fire alarm and BMS systems to facilitate safe evacuation.

All small power and specialist systems shall be interfaced with the Building Management System (BMS) where relevant. This includes status monitoring of key mechanical loads, fault signals from automatic doors or disabled alarms, and supply status of essential services such as the

evacuation lift. Final control points and interfaces shall be coordinated with the BMS provider and integrated as per project requirements. All field devices with BMS connectivity shall be provided with control cabling terminated at agreed locations.

All electrical accessories and control devices shall be clearly labelled using engraved traffolyte or industrial-grade thermal labels. Circuit references shall correspond with those indicated on as-built drawings and distribution board schedules.

Testing and commissioning shall be carried out in accordance with Part 6 of BS 7671, including insulation resistance, polarity, continuity, earth fault loop impedance, RCD testing, and functional verification. All final circuits shall be verified and documented in Electrical Installation Certificates (EICs) with schedules of inspections and test results.

On completion of the installation, the following documentation shall be submitted: Electrical Installation Certificate(s), schedules of test results, as-built drawings (in PDF and DWG formats), O&M manuals, and all relevant manufacturer data sheets. The system shall be fully demonstrated to the client's representative, with training provided where appropriate.

There is a specialist audio visual system to be installed to the building, design responsibility for this is with Chris Lewis. We have indicated devices on the 0801 series layouts but please note that these are for coordination only. Please liaise with Chris Lewis for the latest information.

2. System performance: [Ss_70_30_80/215 Low voltage small power cables generally](#)
[Ss_70_30_80/220 Selection of conduit, trunking and ducting generally](#)
[Ss_70_30_80/230 Multi-gang power outlets.](#)
3. Final circuit cabling: [Pr_65_70_48_29 Fire-resistant screened \(LSHF\) cables](#); [Pr_65_70_48_55 Multicore screened thermosetting-insulated \(LSHF\) sheathed cables](#); [Pr_65_70_48_88 Thermosetting insulated armoured fire-resistant low-smoke halogen-free \(LSHF\) cables](#)
4. Cable accessories: [Pr_65_70_11_15 Cable ties](#)
[90-55-10/320 Cable bands](#)
5. Containment: [Pr_65_70_11_71 Rigid conduit type A](#); [Pr_65_70_11_12 Cable baskets](#);
[Pr_65_70_11_17 Cable trays](#)
6. Rewireable installation: Required.
7. Concealed installation: Required.
8. Electrical accessories and outlets: [Pr_65_72_97_83 Surface and concealed wiring enclosures](#)
[Pr_65_72_97_31 Fused connection units](#)
[Pr_65_72_97_12 Cable outlet plates](#)
9. Electrical identification: [Pr_40_10_57_29 Equipment labels and warning notices](#)
[Pr_40_10_57_23 Electrical diagrams](#)
10. Execution: [Ss_70_30_80/620 Small power installation](#); [Ss_70_30_80/630 Installing cabling to socket outlets](#)
11. System completion: [Ss_70_30_80/820 Documentation.](#)

System performance

Ss_70_30_80/215 Low voltage small power cables generally

1. Standard: In accordance with [BS 7671](#).
2. Proposed selection of low voltage cables: Submit drawings, technical information, calculations and manufacturers' literature.
3. Conductor sizes (minimum): Refer to project circuit charts.
4. Cable sizes not stated: Query with Harley Haddow.

Ss_70_30_80/220 Selection of conduit, trunking and ducting generally

1. Standard: In accordance with [BS 7671](#).

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2. **Requirement:** Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
 3. Conduit, trunking and ducting sizes not stated: Submit.

Ss_70_30_80/230 Multi-gang power outlets

1. Quantity: Refer to drawings.

Products

See [90-55-10/320 Cable bands](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_40_10_57_23 Electrical diagrams](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

See [Pr_40_10_57_29 Equipment labels and warning notices](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

Pr_65_70_11_12 Cable baskets

Shared by: [Ss_75_10_21_21 Data distribution systems](#)

1. Manufacturer: Legrand
2. Standard: To [BS EN 61537](#).
3. Material: 5 mm steel wire.
4. Coating material: Hot dip galvanized.
5. Sizes
 - 5.1. Width: Refer to Design drawings.
 - 5.2. Side height: 105 mm.
6. Features
 - 6.1. Segregation: Refer to drawings
 - 6.2. Protective cover: Not required.
7. Execution: [Pr_65_70_11/630 Installing cable basket Type A](#)

See [Pr_65_70_11_13 Cable cleats](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11_15 Cable ties](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

Pr_65_70_11_17 Cable trays

Shared by: [Ss_75_50_11_27 Emergency voice communication systems](#) and [Ss_75_40_02_11 Card access control systems](#)

1. Manufacturer: [Legrand Electric Ltd](#)
2. Contact details
 - 2.1. Address: Great King Street North
Birmingham
West Midlands
United Kingdom
B19 2LF
 - 2.2. Telephone: [0345 605 4333](tel:03456054333)
 - 2.3. Web: <https://www.legrand.co.uk/en>
 - 2.4. Email: uk-training@legrand.co.uk
3. Standard: To [BS EN 61537](#).
4. Material: Metal.
5. Resistance against flame propagation: Non flame propagating.

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6. Electrical properties
 7. Coating material: Hot-dip-galvanized.
 8. Execution:

[Pr_65_70_11/621](#) Installing cable tray and cable ladder;
[Pr_65_70_11/650](#) Multiple cable runs;
and [Pr_65_70_11/661](#) Cable support zones.

See [Pr_65_70_11_71](#) Rigid conduit type A in [Ss_70_30_45_45](#) Low-voltage distribution systems

See [Pr_65_70_48_29](#) Fire-resistant screened (LSHF) cables in [Ss_70_30_45_45](#) Low-voltage distribution systems

Pr_65_70_48_55 Multicore screened thermosetting-insulated (LSHF) sheathed cables

1. Manufacturer: Submit proposals .
2. Standard: To [BS 8436](#).
3. Third-party certification: British Approvals Service for Cables ([BASEC](#))-certified.
4. Size: Manufacturer's standard .
5. Execution: [Pr_65_70_48/635](#) Installing low-voltage cables
[90-55-15/640](#) Extra low and low voltage cable routes
[90-55-15/645](#) Low voltage cables concealed in walls and partitions
[90-55-15/650](#) Extra low and low voltage cables in accessible roof spaces
[90-55-15/655](#) Extra low and low voltage surface mounted cables
[Pr_65_70_48/660](#) Installing low-voltage cables in conduit and trunking; [Pr_65_70_48/735](#) Cable installation on channel cable supports, cable tray, cable ladder and cable basket

Pr_65_70_48_88 Thermosetting insulated armoured fire-resistant low-smoke halogen-free (LSHF) cables

1. Manufacturer: Submit proposals
2. Standard: To [BS 7846](#).
3. Third-party certification: British Approvals Service for Cables ([BASEC](#))-certified.
4. Oversheath colour: Black.
5. Execution: [Pr_65_70_48/680](#) Installing low-voltage armoured cables; [Pr_65_70_48/740](#) Cables in vertical trunking and ducts

Pr_65_72_97_12 Cable outlet plates

1. Manufacturer: TBC by JFA
2. Standard: To [BS 5733](#).
3. Mounting: Flush.
4. Flex outlet: Submit proposals .
5. Plate
6. Execution: [Pr_65_72_97/610](#) Installing electrical accessories.

Pr_65_72_97_31 Fused connection units

1. Manufacturer: TBC by JFA
2. Standard: To [BS 1363-4](#).
3. Control
 - 3.1. Type: Double pole, switched and Unswitched. Refer to drawings for types and locations
4. Mounting: Flush.

-
5. Flex outlet: Base entry.
 6. Cable termination: Screwed.
 7. Fuse carrier access: Screw.
 8. Plate
 - 8.1. Material: Plastic
 - 8.2. Finish: White
 9. Execution: [Pr_65_72_97/610 Installing electrical accessories](#).

Pr_65_72_97_83 Surface and concealed wiring enclosures

1. Manufacturer: Submit proposals
2. Standards
 - 2.1. Concealed enclosures: To [BS 4662](#).
 - 2.2. Surface enclosures: To [BS 5733](#).
3. Enclosure
 - 3.1. Material: Moulded plastics.
 - 3.2. Finish: White
4. Enclosure depth (minimum): 35 mm.
5. Execution: [Pr_65_72_97/610 Installing electrical accessories](#).

Execution

90-55-15/640 Extra low and low voltage cable routes

1. Cables generally:
 - 1.1. Concealed cable runs to wall accessories: Run vertically from the accessory.
 - 1.2. Exposed cable runs: Submit proposals .
2. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.

90-55-15/645 Low voltage cables concealed in walls and partitions

1. Position: In a zone within 150 mm of wall perimeter (except at the floor); and run vertically or horizontally from these zones, or from floor level, to switches, accessories, etc.
2. Protection: [Pr_65_70_11_71 Rigid conduit type A](#).

90-55-15/650 Extra low and low voltage cables in accessible roof spaces

1. Cables running across ceiling joists: [Pr_65_70_11_17 Cable trays](#).

90-55-15/655 Extra low and low voltage surface mounted cables

1. Fastening: Direct to surface.
2. Orientation: Dress cables flat, free from twists, kinks and strain.
3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Pr_65_70_11/621 Installing cable tray and cable ladder

Shared by: [Pr_65_70_11_17 Cable trays Type A](#)

1. Standards: To [BS 7671](#) and in accordance with [IEE Guidance Note 1](#).
2. Preparation

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- 2.1. **Burrs and sharp edges:** Make smooth.
 - 2.2. **Cutting:** Minimize and make good edges. Cuts to cable tray to be square along an unperforated line.
 - 2.3. **Treatment of cut surface:** Extend 25 mm beyond the cut. Match finish of cable supports.
 3. **Access:** Provide space around cable ladder and tray to permit access for installing and maintaining cables.
 4. **Changes of size and direction:** Manufacturer's accessories of the same material type, pattern, finish and thickness as cable supports.
 5. **Fire barriers:** Provide where required to maintain fire performance of fabric.
 6. **Protective covers:** Provide to cables requiring mechanical protection.
 7. **Support**
 - 7.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
 - 7.2. **Clearance from building fabric (minimum):** 20 mm.
 8. **Components:** Avoid contact between dissimilar metals.
 9. **Routing of cable ladder and tray:** Submit drawings showing the proposed routes of cable ladder and cable tray.

Pr_65_70_11/630 Installing cable basket Type A

Shared by: [Pr_65_70_11_12 Cable baskets Type A](#)

1. **Standards:** In accordance with [BS 7671](#) and [IET Guidance Note 1](#).
2. **Joints:** Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. **Accessories:** Form on site and connect with basket manufacturer's coupling components.
4. **Fire barriers:** Provide where required to maintain fire performance of fabric.
5. **Support**
 - 5.1. **Fixing arrangement:** Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
 - 5.2. **Clearance from building fabric (minimum):** 20 mm.
6. **Components:** Avoid contact between dissimilar metals.
7. **Routing of cable basket:** Submit drawings showing the proposed routes.

Pr_65_70_11/650 Multiple cable runs

Shared by: [Pr_65_70_11_17 Cable trays Type A](#)

1. **Requirement:** Use cable basket when three or more cables are run in parallel.

Pr_65_70_11/661 Cable support zones

Shared by: [Pr_65_70_11_17 Cable trays Type A](#)

1. **Ceiling voids:** Provide clear distance of 150 mm (minimum) between underside of any cable supports and brackets and the topside of ceiling.
 - 1.1. Clear distance between underside of cable supports and brackets and topside of ceiling (minimum): 150 mm.

See [Pr_65_70_11/700 Installing conduit, trunking and ducting in Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11/721 Installing rigid metallic conduit in Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11/735 Installing conduit connections to equipment](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11/765 Conduit, trunking and ducting zones](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_48/635 Installing low-voltage cables](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

1. Cable installation: Orderly and capable of being withdrawn.
2. Single core wiring: Arrange using the loop-in method.
3. Cables within trunking: Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.
4. Cables in vertical conduit: Provide cable clamps in accessible conduit boxes at 5 m intervals.
5. Extra-low-voltage cables: Install within a separate partition from low voltage cables where installed in multi compartment trunking.

Pr_65_70_48/680 Installing low-voltage armoured cables

1. General requirements: [Pr_65_70_48/635 Installing low-voltage cables](#)
2. Earthing: Bond armour to equipment and main earthing system.
3. Connections to apparatus: Moisture proof, sealed glands and shrouds.

See [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

Pr_65_70_48/740 Cables in vertical trunking and ducts

1. Supports: Pin racks or cleats at each floor level or at 5 m vertical centres, whichever is less.
2. Heat barriers: Required.

Pr_65_72_97/610 Installing electrical accessories

1. Standard: In accordance with [BS 7671](#).
2. Accessory faceplates: Free from any traces of plaster, grout, paint or similar.
3. Positioning: Coordinate with other wall or ceiling mounted equipment.
4. Alignment: Align adjacent accessories on the same vertical or horizontal axis.
5. Fixing: Fix securely, plumb and level to vertical and horizontal axes.
6. Mounting heights
 - 6.1. Generally: Measure from finished floor level to centre line of accessory.
 - 6.2. Light switches: Refer to architects setting out drawings.
 - 6.3. Single voltage shaver outlets: Refer to Architects Setting Out Drawings.
 - 6.4. Shaver supply units: Submit proposals .
 - 6.5. Socket outlets: Refer to Architects Setting Out Drawings.
 - 6.6. Fan isolators: Contractor's choice . Safe location adjacent to the equipment it serves.
 - 6.7. Cooker connection units: Refer to Architects Setting Out Drawings
 - 6.8. Telecommunications and data outlets: Refer to Architects Setting Out Drawings.
7. Separation distance between adjacent accessories (minimum): 30 mm and Refer to Architects Setting Out Drawings.

Ss_70_30_80/620 Small power installation

1. Standard: In accordance with [BS 7671](#).

Ss_70_30_80/630 Installing cabling to socket outlets

1. General: Refer to drawings and Distribution Board schedules.

System completion

Ss_70_30_80/820 Documentation

1. Operating and maintenance instructions
 - 1.1. Scope: Submit for the system giving optimum settings for controls.
 - 1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 1.3. Format: Paper copy and Electronic copy.
 - 1.4. Number of copies: Two.
2. Record drawings
 - 2.1. Content: For all low voltage final circuits, the cable origin, circuit designation, route, loading, conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in trunking and conduit;
Whether cables are run on surface, concealed in walls, floors, above suspended ceilings or within roof spaces;
Location, route and depth of underground cables;
Location of LV switchgear including distribution boards;
Routes of trunking, conduit, cable tray and cable ladders;
and Location of all electrical outlets, including isolators, starters, control equipment and electrical accessories Schematic drawings showing all low voltage final circuits, the cable origin, circuit designation, cable type, size, number of cores, size and type of overcurrent protective device..
 - 2.2. Format: Electronic drawing.
3. Submittal date: At handover.

Ω End of System

Ss_70_80_33_35 Hardwired general lighting systems

Systems

Ss_70_80_33_35 Hardwired general lighting systems

1. **Description:** The Electrical Contractor shall be responsible for the procurement, installation, connection, testing, commissioning, and setting to work of the complete and fully operational lighting, emergency lighting and lighting controls system as detailed in the documentation provided by PJC Light Studio. Emergency lighting documentation provided by Harley Haddow.

This specification section sets out the materials and workmanship aspects of the lighting installation only, all design responsibility and information is by others.

Refer to the PJC Light Studio design layouts and documentation for the main lighting scope and installation requirements.

Lighting control is to be advised by PJC Light Studio.

2. System performance: [70-80-35/250 Luminaire and lamp maintenance properties](#)
3. Final circuit cabling: [Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed \(LSHF\) cables Type A](#)
4. Containment: [Pr_65_70_11_12 Cable baskets Type A](#)
5. Concealed installation: Required.
6. Lamp types: [Pr_70_70_46_78 Self-ballasted LED lamps](#)
7. Connections to luminaires: [Pr_65_70_48_49 Light-duty PVC-insulated and sheathed flexible cables](#)
8. Electrical identification: [Pr_40_10_57_29 Equipment labels and warning notices](#)
[Pr_40_10_57_23 Electrical diagrams](#)
9. Execution: [Ss_70_80_33/630 Installing general lighting systems](#); [Ss_70_80_33/720 Labelling of lighting controls](#)
10. System completion: [Ss_70_80_33/810 Testing and commissioning of general lighting systems](#); [Ss_70_80_33/820 Documentation relating to general lighting](#); [Ss_70_80_33/830 Spares for lighting systems](#); [Ss_70_80_33/840 Maintenance of lighting systems](#)

System performance

70-80-35/250 Luminaire and lamp maintenance properties

1. Lamp replacement method: Spot replacement.
2. Lamp lumen maintenance factor: Submit proposals .
3. Lamp survival factor: Submit proposals .
4. Luminaire maintenance class: Submit proposals .
5. Luminaire cleaning interval: 1 y.
6. Luminaire maintenance factor: Submit proposals .
7. Room surface cleaning interval: 1 y.
8. Room surface maintenance factor: Submit proposals .

Products

90-55-10/320 Cable bands Type A

1. Manufacturer: Contractor's choice .

2. Format: Perforated metal bands.

2.1. Material: Steel.

2.2. Protective covering: LSHF.

See [Pr_40_10_57_23](#) Electrical diagrams in [Ss_70_30_25_25](#) Earthing and bonding systems

See [Pr_40_10_57_29](#) Equipment labels and warning notices in [Ss_70_30_25_25](#) Earthing and bonding systems

Pr_65_70_11_12 Cable baskets Type A

1. Standard: To [BS EN 61537](#).

2. Material: 5 mm steel wire.

3. Coating material: Hot dip galvanized.

4. Sizes

4.1. Width: Refer to Design drawings.

4.2. Side height: 105 mm.

5. Features

5.1. Segregation: Refer to drawings

5.2. Protective cover: Not required.

6. Execution: [Pr_65_70_11/630](#) Installing cable basket Type A.

Pr_65_70_11_15 Cable ties Type A

1. Standard: To [BS EN 62275](#).

2. Format: Wrap around self-locking releasable.

3. Material: Metal.

4. Contribution to fire : Non-flame propagating.

5. Environmental influences

5.1. Non-metallic and composite components: Resistant to ultraviolet light.

5.2. Metallic and composite components: Resistant to corrosion.

Pr_65_70_48_49 Light-duty PVC-insulated and sheathed flexible cables

1. Manufacturer: Submit proposals .

2. Standards: To [BS EN 50525-1](#) and [BS EN 50525-2-11](#).

3. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.

4. Cable type: H03VV-F. Where on view, cable specification to be submitted for review by the Architect and Engineer.

5. Size: Manufacturer's standard .

6. Sheath colour: White where concealed out of view. Where exposed to view, sheath will be clear with conductor material being tinned copper cable. Specification of finish to be approved by the architect prior to procurement.

7. Execution: [Pr_65_70_48/665](#) Installing flexible cables.

Pr_65_70_48_91 Thermosetting-insulated and thermoplastic-sheathed (LSHF) cables Type A

1. Standard: To [BS 7211](#).

2. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.

3. Cable type: BS8436. Manufacturer's standard .

4. Size: Refer to circuit charts and Refer to Schematics.

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5. Execution: [Pr_65_70_48/635 Installing low-voltage cables Type A](#) and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type A](#).

Pr_70_70_46_78 Self-ballasted LED lamps

1. Manufacturer: Refer to luminaire schedule.
2. Standards: To [BS EN 62560](#) and [BS EN 62612](#).
3. Third-party certification: [BSI Kitemark](#) approved.
4. Wattage: Refer to luminaire schedule
5. Colour temperature: Refer to luminaire schedule
6. Colour rendering index (Ra): 80–89.
7. Rated life (minimum): Manufacturer's standard .
8. Initial lumens (minimum): Manufacturer's standard .
9. Dimmable: Yes.

Execution

See [Pr_65_70_11/630 Installing cable basket Type A](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

Pr_65_70_48/635 Installing low-voltage cables Type A

1. Standard: In accordance with [BS 7671](#).
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Preparation: Store cables above 5°C for 24 hours before installation.
Clear cable path of debris.
4. Installation temperature (minimum): 5°C.
5. Cables: Install in one length. Dress cables flat, free from twists, kinks and strain.
6. Cable pulling: Do not overstress. Prevent kinks and twisting of the cable.
7. Cable protection: Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. Concealed cable runs to wall accessories: Run vertically from the accessory.
9. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.
10. Jointing and termination
 - 10.1. Final circuit cables: At electrical accessories only.
 - 10.2. Core connections: Using compression lugs to equipment without integral clamping terminals.
 - 10.3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Pr_65_70_48/665 Installing flexible cables

1. General requirements: [Pr_65_70_48/635 Installing low-voltage cables Type A](#) .
2. Cables: Grip securely at connections. Where cord grips do not form an integral part of the accessory or equipment, provide separate proprietary cord grips.

Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type A

1. Cabling: Install when cable supports are complete.
2. Position: Place single and multi-core cables side by side.

3. Fastening

- 3.1. Fastenings generally: Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed. Cleat all cables on riser sections.
- 3.2. Submain cables <95 mm²: [90-55-10/320 Cable bands Type A](#). Cleat for riser sections
 - 3.2.1. Spacing (maximum): 600 mm.
- 3.3. Final circuit cabling: [Pr_65_70_11_15 Cable ties Type A](#).
 - 3.3.1. Spacing (maximum): 600 mm.
- 3.4. Extra-low-voltage, communications and fibre-optic cabling: [Pr_65_70_11_15 Cable ties Type A](#).
 - 3.4.1. Spacing (maximum): 600 mm.

Ss_70_80_33/630 Installing general lighting systems

1. Standard: In accordance with [BS 7671](#) and [CIBSE Commissioning Code L](#).
2. Connection of luminaire-supporting couplers
 - 2.1. General luminaires: White plug with white cover.
3. Switches and controls
4. Rooms smaller than 4 m²: Restrict lighting circuits to one electrical phase.

Ss_70_80_33/720 Labelling of lighting controls

1. Equipment and sensor identification labels: Provide.
2. Lighting controls: Label each component describing its purpose.
3. Output circuits: Label each cable at point of connection to lighting distribution boxes, master distribution boxes and lighting control modules.

System completion

Ss_70_80_33/810 Testing and commissioning of general lighting systems

1. Standards: In accordance with [BS 7671](#) and [CIBSE Commissioning Code L](#).
2. Certificates of calibration for meters and instruments: Submit.

Ss_70_80_33/820 Documentation relating to general lighting

1. Operating and maintenance instructions
 - 1.1. Scope: Submit for the system giving optimum settings for controls.
 - 1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
2. Record drawings
 - 2.1. Content: General arrangement drawings showing the location of luminaires, lighting circuit distribution boxes, master and slave distribution boxes, switch modules, manual and automatic switches and controls including time switches, passive infrared detectors, and daylight sensors .
 - 2.2. Format: Electronic drawing.
3. Submittal date: At handover

Ss_70_80_33/830 Spares for lighting systems

1. Sensors: One of each type.
2. Lamps
 - 2.1. Quantity of each type to be supplied: Two.

Ss_70_80_33/840 Maintenance of lighting systems

1. Servicing and maintenance: Undertake.
2. Duration: Until 12 months after completion.

Ω End of System

Ss_75_10_21_21 Data distribution systems

Systems

Ss_75_10_21_21 Data distribution systems

1. System performance: [Ss_75_10_21/210 Design of data distribution systems](#); [Ss_75_10_21/260 Connections with other systems Type A](#)
2. Applications: PoE Type 4 ([BS ISO/IEC/IEEE 8802-3](#) bt Power over Ethernet).
3. Cabling hierarchy
 - 3.1. Campus backbone cabling: [Pr_65_70_15_58 Optical fibre cables](#)
 - 3.2. Building distributors (BD): [Pr_70_75_04_52 Modular jacks](#); [Pr_80_77_28_21 Data equipment cabinets](#); [Pr_80_77_28_06 Balanced twisted pair cabling patch panels](#)
 - 3.3. Building backbone cabling: [Pr_65_70_15_06 Balanced twisted pair cables](#)
 - 3.4. Subsidiary distributors: [Pr_80_77_28_06 Balanced twisted pair cabling patch panels](#)
 - 3.5. Horizontal cabling: [Pr_65_70_15_06 Balanced twisted pair cables](#)
 - 3.6. Telecommunications outlets (TO): [Pr_70_75_04_06 Balanced twisted pair cable outlet plates](#)
4. Containment: [Pr_65_70_11_71 Rigid conduit type F](#); [Pr_65_70_11_12 Cable baskets](#)
5. Containment accessories: [Pr_65_70_11_20 Conduit fittings](#); [Pr_20_29_63_50 Masonry plugs](#)
6. Rewireable installation: Required.
7. Concealed installation: Required.
8. System accessories: [Pr_40_10_57_88 Telecommunications equipment and outlets labels](#); [Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices](#)

Wi-fi Access Points

9. Execution: [Ss_75_10_21/625 Installing information technology cabling Type A](#); [Ss_75_10_21/650 Installing cabinets](#); [Ss_75_10_21/660 Connection to the public telephone network Type A](#); [Ss_75_10_21/670 Labelling of data distribution systems components](#)
10. System completion: [Ss_75_10_21/810 Testing and inspection of data distribution systems](#); [Ss_75_10_21/820 Documentation for data distribution systems](#); [Ss_75_10_21/830 Spares and consumables for data distribution systems](#); [Ss_75_10_21/840 Maintenance of data distribution systems](#); [Ss_75_10_21/850 Data distribution system warranty](#)

System performance

Ss_75_10_21/210 Design of data distribution systems

1. System designer
 - 1.1. Evidence of registration: Submit.
2. Design: Complete the design of the data distribution systems.
3. Standards: To [BS EN 50173-1](#). In accordance with [BS 8492](#) . To [BS EN 50174-1](#). To [BS EN 50173-6](#).
4. Cabling topology
 - 4.1. Horizontal cabling: Star.
5. Requirement: Submit proposals, including detailed design drawings indicating cabinet general arrangement, cabling topology schematics, distribution point layouts, equipment room layout, interconnection diagrams and work area layout drawings. Include technical information, calculations and manufacturers' literature.

Ss_75_10_21/260 Connections with other systems Type A

1. Requirements: Security systems

Products

Pr_20_29_63_50 Masonry plugs

1. Format: To suit substrate, loads to be supported and conditions expected in use.

Pr_40_10_57_88 Telecommunications equipment and outlets labels

1. Manufacturer: Submit proposals
2. Material: Wrap-around machine-printed label with cable identifier.
3. Colour
 - 3.1. Background: White
 - 3.2. Lettering: Black
4. Content: Label each outlet with complete circuit reference.

Label patch panels with complete circuit reference.

5. Verification

See [Pr_65_70_11_12 Cable baskets](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

Pr_65_70_11_20 Conduit fittings

1. Manufacturer: Submit proposals
2. Standards: To [BS EN 61386-1](#) and to [BS EN IEC 61386-21](#), [BS EN IEC 61386-22](#), or [BS EN IEC 61386-23](#) as appropriate.
3. Material
 - 3.1. Type: Stainless steel.
 - 3.2. Finish: Match conduit.
4. Conduit boxes: Fit covers of same material and finish as boxes. Include brass earthing terminals in PVC-U boxes.
5. Plugs
 - 5.1. For metallic boxes: Hexagonal malleable iron.
 - 5.2. For non-metallic boxes: Solvent PVC-U.
6. Locknuts
 - 6.1. For metallic boxes: Hexagonal malleable iron.
 - 6.2. For non-metallic boxes: Hexagonal PVC-U.
7. Execution: [Pr_65_70_11/700 Installing conduit, trunking and ducting Type A](#)

Pr_65_70_11_71 Rigid conduit type F

1. Manufacturer: Submit proposals
2. Standards: To [BS EN 61386-1](#) and [BS EN IEC 61386-21](#).
3. Mechanical properties
 - 3.1. Resistance to compression: Medium.
 - 3.2. Resistance to impact: Medium.
 - 3.3. Resistance to bending: Rigid.
 - 3.4. Tensile strength: Medium.

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- 3.5. Suspended load capacity: Medium.
 - 4. Electrical characteristics: With electrical continuity properties.
 - 5. Resistance to external influences
 - 5.1. Protection against ingress of solid objects (minimum): To [BS EN 60529](#), IP3X.
 - 5.2. Protection against ingress of water (minimum): To [BS EN 60529](#), IPX0.
 - 6. Resistance against corrosion: Medium/ high composite protection - Class 2 inside; Class 4 outside.
 - 7. Resistance to flame propagation: Non-flame-propagating.
 - 8. Halogen content: Non-declared.
 - 9. Sizes (OD): To be determined on an individual basis
 - 10. Execution: [Pr_65_70_11/721 Installing rigid metallic conduit Type A](#); [Pr_65_70_11/735 Installing conduit connections to equipment Type G](#); [Pr_65_70_11/765 Conduit, trunking and ducting zones Type G](#)

Pr_65_70_15_06 Balanced twisted pair cables

Shared by: [Ss_75_40_02_11 Card access control systems](#)

- 1. Manufacturer: Submit proposals
- 2. Standard: To [BS EN 50173-1](#).
- 3. Third-party certification: British Approvals Service for Cables ([BASEC](#))-certified.
- 4. Category: 6A.
- 5. Cable type: S/FTP.
- 6. Number of pairs: 4.
- 7. Size: 24 AWG (0.51 mm).
- 8. Sheath
 - 8.1. Type: LSHF.
- 9. Reaction to fire class
 - 9.1. Fire behaviour: B2_{ca}.
 - 9.2. Additional classification for smoke production: s1a.
 - 9.3. Additional classification for flaming droplets and/ or particles: d1.
 - 9.4. Additional classification for acidity: a1.
- 10. Execution: [Pr_65_70_48/635 Installing low-voltage cables Type B](#); [Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking Type D](#)

Pr_65_70_15_58 Optical fibre cables

- 1. Manufacturer: Submit proposals

Pr_70_75_04_06 Balanced twisted pair cable outlet plates

- 1. Manufacturer: Submit proposals
- 2. Standard: To [BS EN 50173-1](#).
- 3. Category: 6A.
- 4. Screening: Match cabling.
- 5. Outlet arrangement: 90°.
- 6. Outlet ports: Single RJ45.
- 7. Spring-loaded shutter: Required.
- 8. Circuit designation label with transparent cover: Required.

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9. Cable termination: Insulation displacement connection (IDC).
 10. Plate
 - 10.1. Material: TBC by Architect. Must be of same construction as adjacent electrical accessories.
 - 10.2. Finish: TBC by Architect. Must be of same finish as adjacent electrical accessories.
 11. Execution: [Pr_65_72_97/610 Installing electrical accessories Type A](#)

Pr_70_75_04_52 Modular jacks

1. Manufacturer: Submit proposals
2. Standard: To [BS EN 50173-1](#).
3. Category: 6A.
4. Screening: Match cabling.
5. Outlet arrangement: 90°.
6. Outlet ports: Double RJ45.
7. Spring-loaded shutter: Required.
8. Circuit designation label with transparent cover: Required.
9. Cable termination: Insulation displacement connection (IDC).
10. Insert colour: TBC by Architects
11. Execution: [Pr_65_72_97/610 Installing electrical accessories Type A](#)

Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices

1. Manufacturer: Submit proposals
2. Standard: To [BS EN 61643-21](#).

Pr_80_77_28_06 Balanced twisted pair cabling patch panels

1. Manufacturer: Submit proposals
2. Standard: To [BS EN 50173-1](#).
3. Arrangement: 19 inch with pre-drilled rear gland holes with integral cable clamps and sliding tray.
4. Height: 2 U.
5. Ports with RJ-45 outlets: 48.
6. Category: 6A.
7. Cable connections
 - 7.1. Front: Pre-loaded with RJ-45 modular jacks.
 - 7.2. Rear: Insulation displacement connection (IDC).
8. Outlet labelling
 - 8.1. Front: Engraved port number with circuit description and transparent cover.
 - 8.2. Rear: Engraved port number.

Pr_80_77_28_21 Data equipment cabinets

1. Manufacturer: Submit proposals
2. Format: To accept 19 inch racking with front and rear adjustable rails.
3. Enclosure
 - 3.1. Mounting: Free standing.
 - 3.2. Size

- 3.2.1.Width: 550 mm.
- 3.2.2.Depth: 450 mm.
- 3.2.3.Height: 9U
- 3.3. Material: Steel.
- 3.4. Finish: Black epoxy powder coating.
- 3.5. Front door: Steel with lock.
- 3.6. Rear door: Steel with lock.
- 3.7. Side panels: Fixed.
- 3.8. Base: Locking castor wheels.
- 4. Cabinet locks: Common key.
- 5. Ventilation: Air vents on both side panels providing natural ventilation.
- 6. Socket outlets
 - 6.1. Type: To [BS 1363-2](#).
 - 6.2. Arrangement: One vertical power module with eight outlets mounted at rear and master power switch at front.
- 7. Space for active equipment: 4 U.
- 8. Horizontal cable supports: 1 U for each 48 port patch panel with 1 U spare.
- 9. Vertical cable supports: Left and right hand sides at 8 U spacing.
- 10. Spare U sections: Provide individual blanking plates.

Execution

See [Pr_65_70_11/630 Installing cable basket Type A](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

Pr_65_70_11/700 Installing conduit, trunking and ducting Type A

- 1. Standards: In accordance with [BS 7671](#) and [IET Guidance Note 1](#).
- 2. Preparation: Cut square. Remove burrs and sharp edges to make smooth.
- 3. Protection of metallic conduit, trunking and ducting
 - 3.1. Joints and ends: Remove grease, oil, dirt and rust before applying protective paint. Paint immediately following installation.
 - 3.2. Protective paint
 - 3.2.1.Generally: Compatible with conduit, trunking and ducting finish.
 - 3.2.2.Type: TBC by Architect
- 4. Cross-sectional area: Maintain throughout the conduit, trunking and ducting length.
- 5. Arrangement: Position vertically and horizontally in line with equipment served, and parallel with building lines.
- 6. Draw wires: Install galvanized soft iron wires within spare conduit, trunking and ducting.
- 7. Distance from other services running parallel (minimum)
 - 7.1. Generally: 150 mm.
 - 7.2. Above radiators: 1000 mm.
 - 7.3. Steam services: 600 mm.
- 8. Drainage of conduit, trunking and ducting: Locate drainage outlets at lowest points in conduit, trunking and ducting installed externally, and where condensation may occur.
- 9. Fire barriers: Provide to maintain integrity of fire compartments.
- 10. Rewireable installations: Enable rewiring from accessible boxes or accessories only.
- 11. Support: Independently fix and support conduit, trunking and ducting from building structure.

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12. **Cleaning:** Clean insides of conduit, trunking and ducting before installing cables.
 13. **Cabling:** Install when conduit, trunking and ducting enclosure is complete.
 14. **Submittals:** Submit manufacturer's technical information. Submit drawings showing the proposed routes of conduit, trunking and ducting and the location of service outlets.

Pr_65_70_11/710 Installing conduit generally

1. **Fixing:** Fix securely. Fix boxes independently of conduit.
2. **Changes of direction:** Conduit boxes or bends site formed by machine. Do not use elbows, tees or inspection bends.
3. **Joints**
 - 3.1. **Generally:** Manufacturer's jointing fittings.
 - 3.2. **Number of joints:** Minimize.
 - 3.3. **Lengths of conduit:** Maximize.
 - 3.4. **Open ends:** Plug.
 - 3.5. **At movement joints in structure:** Manufactured expansion coupling. Install adaptable boxes on both sides of joint at a maximum distance of 300 mm.
4. **Connections to boxes, trunking, equipment and accessories:** Screwed couplings with rubber bushes at open ends.
5. **Conduit boxes**
 - 5.1. **Generally:** Install flush with finished surfaces. Provide extension rings if required.
 - 5.2. **Fixing screws:** Countersunk or round-headed screws.
 - 5.3. **Number of fixings (minimum):** Two.
 - 5.4. **Lids:** Fasten with brass slot pan head screws.
6. **Rear outlet boxes:** Locate where surface conduits pass through walls to external equipment.
7. **Draw-in boxes**
 - 7.1. **Spacing (maximum):** 10 m.
 - 7.2. **Number of bends between draw-in boxes (maximum):** Two.
 - 7.3. **Floors:** Do not install draw-in boxes in floors.
8. **Conduit in walls:** Avoid concealed horizontal runs.
9. **Suspended ceiling installations:** Fasten outlet boxes to structure above ceiling.

Pr_65_70_11/721 Installing rigid metallic conduit Type A

1. **General requirements:** [Pr_65_70_11/700 Installing conduit, trunking and ducting Type A](#); [Pr_65_70_11/710 Installing conduit generally](#)
2. **Joints:** Screwed.
3. **Threaded conduits:** Tightly screw to ensure electrical continuity, with no thread showing.
4. **Conduit connections to boxes and items of equipment, other than those with threaded entries:** Earthing coupling with male brass bush and protective conductor.

Pr_65_70_11/735 Installing conduit connections to equipment Type G

1. **General requirements:** [Pr_65_70_11/700 Installing conduit, trunking and ducting Type A](#); [Pr_65_70_11/710 Installing conduit generally](#)
2. **Surface-mounted equipment**
 - 2.1. **Concealed conduit:** Conceal the final connection.
 - 2.2. **Exposed conduit:** Contain the final connection from the conduit box within flexible metal conduit.

3. **Equipment subject to vibration:** Flexible metal conduit of adequate length to facilitate removal of equipment for maintenance. Final termination in swivel connectors.
4. **Connections to external equipment:** Flexible conduit.

Pr_65_70_11/765 Conduit, trunking and ducting zones Type G

1. **General requirements:** [Pr_65_70_11/700 Installing conduit, trunking and ducting Type A](#)
2. **Ceiling voids:** Provide clear distance of 150 mm (minimum) between underside of any conduit, trunking or trunking and the topside of ceiling.

Pr_65_70_48/635 Installing low-voltage cables Type B

1. **Standard:** In accordance with [BS 7671](#).
2. **Timing:** Do not start internal cabling until building enclosure provides permanently dry conditions.
3. **Preparation:** Store cables above 5°C for 24 hours before installation.

Clear cable path of debris.

4. **Installation temperature (minimum):** 5°C.
5. **Cables:** Install in one length. Dress cables flat, free from twists, kinks and strain.
6. **Cable pulling:** Do not overstress. Prevent kinks and twisting of the cable.
7. **Cable protection:** Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. **Concealed cable runs to wall accessories:** Run vertically from the accessory.
9. **Exposed cable runs:** Exposed cable runs should be concealed in containment.
10. **Distance from other services running parallel (minimum):** 150 mm. Position cables below heating pipes.
11. **Jointing and termination**
 - 11.1. **Final circuit cables:** At electrical accessories only.
 - 11.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.
 - 11.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking Type D

1. **Cable installation:** Orderly and capable of being withdrawn.
2. **Single-core wiring:** Arrange using the loop-in method.
3. **Cables within trunking:** Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.
4. **Cables in vertical conduit:** Provide cable clamps in accessible conduit boxes at 5 m intervals.
5. **Extra-low-voltage cables:** Install within a separate partition from low-voltage cables where installed in multi compartment trunking.

Pr_65_72_97/610 Installing electrical accessories Type A

1. **Standard:** In accordance with [BS 7671](#).
2. **Accessory faceplates:** Free from any traces of plaster, grout, paint or similar.
3. **Positioning:** Coordinate with other wall- or ceiling-mounted equipment.
4. **Alignment:** Align adjacent accessories on the same vertical or horizontal axis.
5. **Fixing:** Fix securely, plumb and level to vertical and horizontal axes.
6. **Mounting heights**

6.1. Generally: To be confirmed by JFA.

7. Separation distance between adjacent accessories (minimum): 20 mm.

Ss_75_10_21/625 Installing information technology cabling Type A

1. System installer
 - 1.1. Registration: Corporate member of the Telecommunications Industry Association (TIA).
 - 1.2. Evidence of registration: Submit.
2. Standards
 - 2.1. Generally: In accordance with [BS 6701](#), [BS 7671](#), [BS 8492](#) and [BS EN 50174-1](#).
 - 2.2. Indoor installations: In accordance with [BS EN 50174-2](#).
 - 2.3. Outdoor installations: In accordance with [BS EN 50174-3](#).
3. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
4. Cables: Install in one uninterrupted run.
5. Arrangement: Position vertically and horizontally in line with equipment served, and parallel with building lines.
6. Orientation: Dress cables flat, free from twists, kinks and strain. Optical fibre cables to be run parallel to, or on top of, copper cables.
7. Cable pulling: Do not overstress.
8. Cable binders
 - 8.1. Type: Reusable plastics wrap-around cable ties.
 - 8.2. Spacing (minimum): Where used to tie multiple cables together, irregularly space with maximum distance on horizontal cabling runs of 1000 mm and on vertical runs of 300 mm. All cable binders to be loosely fitted.
9. Jointing: At equipment and terminal fittings only.
10. External cabling: Terminate within 2 m of entrance to building.
11. Cables routes generally
 - 11.1. Concealed cable runs to wall accessories: Run vertically from the accessory.
 - 11.2. Exposed cable runs: Submit proposals.
12. Cable segregation
 - 12.1. Cables from other systems: Segregate from other cabling and cross at right angles. Where installed in trunking, locate in a dedicated telecommunications compartment.
 - 12.2. Distance from other cables: In accordance with [BS EN 50174-2](#) and [BS EN 50174-3](#).
 - 12.3. Distance from wet services pipework: 500 mm minimum.
13. Terminations: Support cable within 150 mm of termination.
14. Spare cable length at termination points (minimum): 500 mm.
15. Balanced twisted pair cabling
 - 15.1. Pin assignment: Option B.
 - 15.2. Maximum untwist at terminations: 12 mm.

Ss_75_10_21/650 Installing cabinets

1. Cable termination sequence: Left to right and bottom to top.
2. Fixing: Level and secure to floor or wall. Group wall-mounted cabinets into logical arrangements.
3. Cable route: Do not exceed 24 cables in any loom. Maximum distance between cable supports: 300 mm.
4. Patch panels: Install any fibre-optic patch panels at top of cabinet with copper patch panels below.

-
5. **Interconnecting cabinets:** Connect without side panels with manufacturer's baying kit.
 6. **Cabinet identification**
 - 6.1. **Type:** Face-engraved rigid plastic laminate.
 - 6.2. **Colour**
 - 6.2.1. **Background:** White.
 - 6.2.2. **Lettering:** Black.

Ss_75_10_21/660 Connection to the public telephone network Type A

1. **Public telephone network:** Connect to the main telecommunication cabinet.
2. **Cable type:** BT specification CW1308.

Ss_75_10_21/670 Labelling of data distribution systems components

1. **Standards:** In accordance with [BS EN 50174-1](#), [BS EN 50174-2](#) and [BS EN 50174-3](#).
2. **Equipment:** Label with unique identifier on face-engraved rigid plastic laminate.
3. **Cable schedules**
 - 3.1. **Location:** At each cabinet.
 - 3.2. **Format:** Card within a reusable clear plastics envelope.
 - 3.3. **Size:** A5.
 - 3.4. **Contents:** Incoming cable designation, purpose and origin.

Outgoing cable designation, purpose and destination.
4. **Patch panels:** Machine-printed label with patch panel identifier.
5. **Outlet ports:** Machine-printed label with circuit description.
6. **Cables:** Wrap-around machine-printed label with cable identifier within 100 mm of each termination and every 4 m throughout the cable length.
7. **Outlets:** Machine-printed label with circuit description.

System completion

Ss_75_10_21/810 Testing and inspection of data distribution systems

1. **Standards:** In accordance with [BS EN 50173-1](#).
2. **Inspection of cabling:** Inspect cables for kinks, bends, snags and compression and deformation damage.
3. **Permanent link:** Measure length of each cabling segment (connector to connector).
4. **Pin assignment and continuity:** Verify and submit results.
5. **Cable temperature during testing:** Submit.
6. **Results:** Submit in accordance with [BS EN 50346](#), Annex A.
7. **Certificates of calibration for meters and instruments:** Submit.

Ss_75_10_21/820 Documentation for data distribution systems

1. **Standard:** In accordance with [BS EN 50174-1](#).
2. **Operating and maintenance instructions**
 - 2.1. **Scope:** Submit for the system giving optimum settings for controls.
 - 2.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 2.3. **Format:** Digital

3. Record drawings

- 3.1. Content: General arrangement drawings.
Cabling topology schematics.
Distribution point layout drawings. Equipment room layout drawings.
- 3.2. Format: A1 paper print drawing.
Electronic drawing.
- 3.3. Number of copies: Two.

4. System warranty: Submit.

5. Submittal date: At handover.

6. Cabling topology schematics

- 6.1. Location: Main server room.
- 6.2. Format: Laminated A1 size paper print.
- 6.3. Installation: Wall-mounted with cup and screw fixings.

Ss_75_10_21/830 Spares and consumables for data distribution systems

- 1. Cable terminations: Supply ten of each type.
- 2. Telecommunication outlets: Supply ten of each type.
- 3. IDC punch down tool: Supply one.
- 4. Patch cord loom spares
 - 4.1. Type: 24-cord.
 - 4.2. Quantity: Two.
- 5. Cabinet keys: Two of each type.

Ss_75_10_21/840 Maintenance of data distribution systems

- 1. Servicing and maintenance: Undertake.
- 2. Duration: Until 12 months after practical completion.

Ss_75_10_21/850 Data distribution system warranty

- 1. Performance warranty
 - 1.1. Warranty period (minimum): 12 months

Ω End of System

Ss_75_40_02_05

Audio intercom systems

Systems

Ss_75_40_02_05 Audio intercom systems

1. System performance: [Ss_75_40_02/225 Design of audio and video intercom systems](#);
[Ss_75_40_02/290 Verification of compliance with design, performance and quality requirements](#)
2. System supplier: [Fermax UK Ltd](#)
3. Contact details
 - 3.1. Address: Unit 36
Saffron Court
Southfields Industrial Estate
Laindon
Essex
SS15 6SS
 - 3.2. Telephone: [+44 \(0\)1277 634555](#)
 - 3.3. Web: [www.fermaxuk.com](#)
 - 3.4. Email: [Specifications@fermax.co.uk](#)
4. System type: Networked.
5. Control equipment: [Pr_75_30_30_42 Intercom entrance panels](#); [Pr_75_30_30_43 Intercom remote handsets](#)
6. Locking mechanisms: [Pr_75_30_27_50 Magnetic locks](#)
7. Cable type: [Pr_65_70_15_06 Balanced twisted pair cables Type A](#)
8. Execution: [Ss_75_40_02/650 Installing intercom systems](#)
9. System completion: [Ss_75_40_02/820 Documentation for electronic access control systems](#);
[Ss_75_40_02/840 Maintenance for electronic access control systems](#); [Ss_75_40_02/870 Testing and commissioning audio intercom systems](#)

System performance

Ss_75_40_02/225 Design of audio and video intercom systems

1. Design: Complete the design of the audio/video intercom system.
2. Requirement: Submit proposals, including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Calling method: Push-button.
4. Method of authorization: Manual door release by human operator only.
5. Remote handset intercommunication: Audio function. Video function.
6. Integration with other systems: Card access control

Ss_75_40_02/290 Verification of compliance with design, performance and quality requirements

1. Standards: In accordance with [BS EN 60839-11-1](#) with respect to credential identification.

Products

Pr_65_70_15_06 Balanced twisted pair cables Type A

1. Manufacturer: Submit proposals

Pr_75_30_27_50 Magnetic locks

Shared by: [Ss_75_40_02_11 Card access control systems](#)

1. Manufacturer: Submit proposals

Pr_75_30_30_42 Intercom entrance panels

1. Manufacturer: [Fermax UK Ltd](#)
2. Contact details
 - 2.1. Address: Unit 36
Saffron Court
Southfields Industrial Estate
Laindon
Essex
SS15 6SS
 - 2.2. Telephone: [+44 \(0\)1277 634555](#)
 - 2.3. Web: [www.fermaxuk.com](#)
 - 2.4. Email: [Specifications@fermax.co.uk](#)
3. Product reference: 9534 MILO
4. Type of operation: Networked.
5. Entrance panel call buttons: One.
6. Integral credential reader: Proximity.
7. Microphone: Integral.
8. Speaker: Integral.
9. Visual indication: Call progress LEDs.
10. Remote door opening: Required.
11. Execution: [Pr_75_30_30/620 Installing intercom entrance panels](#)

Pr_75_30_30_43 Intercom remote handsets

1. Manufacturer: [Fermax UK Ltd](#)
2. Contact details
 - 2.1. Address: Unit 36
Saffron Court
Southfields Industrial Estate
Laindon
Essex
SS15 6SS
 - 2.2. Telephone: [+44 \(0\)1277 634555](#)
 - 2.3. Web: [www.fermaxuk.com](#)
 - 2.4. Email: [Specifications@fermax.co.uk](#)

Execution

Pr_75_30_30/620 Installing intercom entrance panels

1. Entrance panel
 - 1.1. Panel location: Wall.
 - 1.2. Mounting: To be confirmed by the Architect and Heritage Consultant
 - 1.3. Height (finished floor level to underside of equipment): To be confirmed by the Architect and Heritage Consultant

Ss_75_40_02/650 Installing intercom systems

1. Installing cabling
 - 1.1. **Standard:** In accordance with [BS 7671](#), as amended by [BS 7671 Corrigendum](#)
 - 1.2. **Security measures:** Suitably protect all cabling from inadvertent damage or tampering to avoid compromising the security of the system.

System completion

Ss_75_40_02/820 Documentation for electronic access control systems

Shared by: [Ss_75_40_02_11 Card access control systems](#)

1. **Standards:** In accordance with [BS EN 60839-11-1](#) and [BS EN 60839-11-2](#).
2. **System communications:** Submit details of the communication network and any relevant protocols used.
3. **Operating and maintenance instructions**
 - 3.1. **Scope:** Submit for the system, giving all configuration settings.
 - 3.2. **Product information:** Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 3.3. **Format:** Electronic.
4. **Record drawings**
 - 4.1. **Content:** General arrangement drawings. Location of each access point, its associated controller and power supply.
 - 4.2. **Format:** Electronic drawing.

Ss_75_40_02/840 Maintenance for electronic access control systems

1. **Servicing and maintenance:** Undertake.

Ss_75_40_02/870 Testing and commissioning audio intercom systems

1. **Call button:** Verify the operation of call buttons.
2. **Audio communication:** Verify two-way audio communication.
3. **Remote release:** Verify the operation of remote door release facilities.
4. **Visual indication:** Check that LCD information is correctly displayed. Check that all LEDs are operational and function at the correct stage of the call process.
5. **Cables:** Check that all cables are correctly terminated and that connections are tight.
6. **Voltage:** Verify that voltage levels for all items of equipment throughout the system are within the manufacturer's stated range.

Ω End of System

Ss_75_40_02_11

Card access control systems

Systems

Ss_75_40_02_11 Card access control systems

1. System performance: [Ss_75_40_02/230 Connection to fire detection and alarm systems](#);
[Ss_75_40_02/290 Verification of compliance with design, performance and quality requirements Type A](#)
2. System supplier: [Fermex UK Ltd](#)
3. Contact details
 - 3.1. Address: Unit 36
Saffron Court
Southfields Industrial Estate
Laindon
Essex
SS15 6SS
 - 3.2. Telephone: [+44 \(0\)1277 634555](#)
 - 3.3. Web: [www.fermaxuk.com](#)
 - 3.4. Email: [Specifications@fermax.co.uk](#)
4. Registration: A Gold member of the [National Security Inspectorate](#).
5. System type: [Networked](#).
6. Equipment interconnectivity: [Wired](#).
7. Method of authorization: [Pr_75_30_30_68 Proximity cards](#); [Pr_75_30_30_27 Emergency door release break glass units](#); [Pr_75_30_30_71 Request-to-exit buttons](#)
8. Readers: [Pr_75_30_30_67 Proximity card readers](#)
9. Locking mechanisms: [Pr_75_30_27_50 Magnetic locks](#)
10. Controls: [Pr_75_30_30_03 Access control units](#)
11. Cable type: [Pr_65_70_15_06 Balanced twisted pair cables](#)
12. Containment: [Pr_65_70_11_17 Cable trays](#)
13. Execution: [Ss_75_40_02/620 Installing electronic access control systems](#)
14. System completion: [Ss_75_40_02/820 Documentation for electronic access control systems](#)

System performance

Ss_75_40_02/230 Connection to fire detection and alarm systems

1. Operation in the event of a fire signal: [Access points open](#).

Ss_75_40_02/290 Verification of compliance with design, performance and quality requirements Type A

1. Standards: In accordance with [BS EN 60839-11-1](#) with respect to credential identification.

Products

See [Pr_65_70_11_17 Cable trays](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_15_06 Balanced twisted pair cables](#) in [Ss_75_10_21_21 Data distribution systems](#)

See [Pr_75_30_27_50 Magnetic locks](#) in [Ss_75_40_02_05 Audio intercom systems](#)

Pr_75_30_30_03 Access control units

1. Manufacturer: [Fermax UK Ltd](#)
2. Contact details
 - 2.1. Address: Unit 36
Saffron Court
Southfields Industrial Estate
Laindon
Essex
SS15 6SS
 - 2.2. Telephone: [+44 \(0\)1277 634555](#)
 - 2.3. Web: [www.fermaxuk.com](#)
 - 2.4. Email: Specifications@fermax.co.uk

Pr_75_30_30_27 Emergency door release break glass units

1. Manufacturer: Submit proposals
2. Frangible element: Resettable.
3. Protective cover: Required.
4. Colour: Green.
5. Labelling: 'EMERGENCY DOOR RELEASE'.
6. Execution: [Pr_75_30_30/650 Installing emergency break glass units and request-to-exit buttons](#)

Pr_75_30_30_67 Proximity card readers

1. Manufacturer: Submit proposals

Pr_75_30_30_68 Proximity cards

1. Manufacturer: Submit proposals
2. Contactless cards
 - 2.1. Standard: Physical characteristics to [BS ISO/IEC 14443-1](#).

Pr_75_30_30_71 Request-to-exit buttons

1. Manufacturer: Submit proposals
2. Execution: [Pr_75_30_30/650 Installing emergency break glass units and request-to-exit buttons](#)

Execution

See [Pr_65_70_11/621 Installing cable tray and cable ladder](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/650 Multiple cable runs](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/661 Cable support zones](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_48/635 Installing low-voltage cables Type B](#) in [Ss_75_10_21_21 Data distribution systems](#)

See [Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking Type D](#) in [Ss_75_10_21_21 Data distribution systems](#)

Pr_75_30_30/650 Installing emergency break glass units and request-to-exit buttons

1. **Mounting position:** Request-to-exit buttons to be mounted within 200 mm of the latch edge of the door. Ensure that emergency break glass units are wired to directly interrupt power to door locks, independent of the controller or system software.

Ss_75_40_02/620 Installing electronic access control systems

1. **Standards:** In accordance with [BS EN 60839-11-1](#) and [BS EN 60839-11-2](#). In accordance with the [National Security Inspectorate](#) publication [NCP: Code of Practice for design, installation and maintenance of access control systems](#).
2. Installing cabling
 - 2.1. **Standard:** In accordance with [BS 7671](#), as amended by [BS 7671 Corrigendum](#)

System completion

See [Ss_75_40_02/820](#) Documentation for electronic access control systems in [Ss_75_40_02_05](#)
[Audio intercom systems](#)

Ω End of System

Ss_75_40_75_40

Intruder detection and alarm systems

Systems

Ss_75_40_75_40 Intruder detection and alarm systems

1. Description:

Central Control Equipment

The intruder detection system will be centrally managed from an Intruder Alarm Panel (IAP). The IAP will communicate with devices that are distributed throughout the property.

The battery back up design for the intruder detection system control equipment will provide battery power in the event of an electrical power outage. The battery backup power must support the whole system under both normal operation and alarm conditions.

The design of the complete intruder detection system, including battery backup must be in accordance with the industry regulations, BS EN50131 and the latest associated amendments.

Keypads

The keypads will allow for wireless proximity key fobs to activate and deactivate the system.

The keypads will be required to match as close as possible to the electrical accessories in the area of each keypad, for a good aesthetic finish.

Remote Signalling

The remote signalling device will be dual path and will meet Grade 4 standard for remote signalling equipment.

The remote signalling device and programming will meet the requirements of PD 6662:2017.

External sounder

The external alarm sounder will be installed above 3m high and installed with agreement of the architect and the local planning authority.

Movement Detection

Where shown on the security drawings, most spaces, passageway and landing within the property will be protected by dual technology movement detection.

Each detection device will be installed in a corner location, and positioned to avoid false alarm sources such as air conditioning outlets, strong sunlight etc, and located to provide maximum coverage of the space.

If the room design or furniture layout means that full detection is not possible, then additional devices will need to be installed to ensure the complete room is protected.

Magnetic Door Contacts

Where shown on the security drawings, all external doors leading into the property will be fitted with a flush magnetic door contact.

Where double doors are shown, then a magnetic contact is required to each door leaf to report if either door leaf is open.

Magnetic door contacts will be required for all external doors on the ground floor.

It will be necessary to have the magnetic contact cable ways and flush fitting cut outs made at the door manufacturers factory. This will avoid mis-fitting or mis-alignment and will ensure a professional installation.

The security contractor will provide the door manufacturer with the necessary information during door manufacture for the cable way and cut out requirements.

Perimeter Window Detection

Where shown on the security drawings, the perimeter windows will be equipped with vibration detection and flush fitting magnetic contacts, all designed to detect a forced entry.

The number of vibration detection devices per window will be determined by the detection pattern of the device, the window construction and its size and shape.

In addition, and for a more aesthetic finish, the vibration sensors will need to be fitted in positions to make them less obvious, such as to be hidden by curtains or blinds where possible.

As vibration detection device coverage can vary, depending upon the device manufacturer, then the installer must ensure sufficient detection coverage is provided, and may need to provide more than one device to a given window, to ensure complete coverage of that window is afforded.

Where shown on the security drawings, a flush magnetic contact will be required to be installed to each opening window. Where a window has multiple opening windows, then each opening window will require a flush magnetic contact.

It will be necessary to have the vibration devices cable ways and any cut outs required, made at the window manufacturers factory. This will avoid mis-fitting and will ensure a professional installation. The security contractor will provide the window manufacturer with the necessary information during window manufacture.

System programming.

In order to allow the security systems operator and the family to understand the system, the installer will allow for a day to complete the specific client programming and training of the security system. This will include user specific guides and instruction to family and members of the clients staff.

System Standards and Grading Summary

- Installer accreditation. SSAIB or NSI Gold.
 - Intruder detection equipment. Grade 3, EN BS50131.
 - Signalling System. Grade 4 and dual path.
 - Hold up and signalling. PD 6662:2017.
 - Cabling. In accordance with wiring regulations and manufacturers recommendations.
2. System performance: [Ss_75_40_75/210 Design of intrusion and hold-up alarm systems](#);
[Ss_75_40_75/220 System setting and unsetting](#);
[Ss_75_40_75/236 Integration with CCTV systems](#);
[Ss_75_40_75/270 Notification requirements](#);
[Ss_75_40_75/278 Supplementary tamper detection](#);
and [Ss_75_40_75/294 Event recording for grade 4 systems](#).
 3. System manufacturer: A member of [British Security Industry Association](#) and A Gold member of [National Security Inspectorate](#).

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4. Control and indicating equipment (CIE): [Pr_75_80_42_41 Intruder alarm panels](#) and [Pr_75_80_42_42 Intruder alarm remote keypads](#).
 5. Notification equipment: [Pr_75_80_42_28 External intruder alarm sounders](#); [Pr_75_80_42_40 Internal electronic intruder alarm sounders](#); and [Pr_60_75_78_85 Supervised premises transceivers](#).
 6. Detectors: [Pr_75_80_42_16 Combined passive infrared and microwave detectors](#) and [Pr_75_80_42_67 Protective switches](#).
 7. Cable type: [Pr_65_70_15_53 Multicore alarm cables](#).
 8. Containment: [Pr_65_70_11_12 Cable baskets Type C](#)
 9. Rewireable installation: Required.
 10. Concealed installation: Required.
 11. Execution: [Ss_75_40_75/620 Installing intrusion and hold-up alarm systems](#).
 12. System completion: [Ss_75_40_75/810 Testing and commissioning intrusion and hold-up alarms systems](#); [Ss_75_40_75/820 Documentation](#); [Ss_75_40_75/860 System soak testing](#); and [Ss_75_40_75/870 Standby battery testing](#).

System performance

Ss_75_40_75/210 Design of intrusion and hold-up alarm systems

1. Design: Complete the design of the intrusion and hold-up alarm system.
2. Standard: In accordance with [PD 6662](#).
3. Security grading: To [BS EN 50131-1](#), Grade 3.

External notification Grade 4
4. Environmental classification: To [BS EN 50131-1](#), Class II.
5. Power supply: To [BS EN 50131-1](#), Type A.
6. Confirmation of alarm condition
 - 6.1. Standard: In accordance with [BS 8243](#).
 - 6.2. Means of confirmation: Sequential and Telephone (call back).
7. Requirement: Submit proposals In accordance with [DD CLC/TS 50131-7](#), Annex G.

Ss_75_40_75/220 System setting and unsetting

1. Design the system to accommodate the following entry and exit routes
 - 1.1. Entry: Keypads as identified on the drawings.

Also, via mobile device with enabled app.
 - 1.2. Exit: Keypads as identified on the drawings.

Also, via mobile device with enabled app.

Ss_75_40_75/236 Integration with CCTV systems

1. Integration: In accordance with [BS 8418](#).

Ss_75_40_75/270 Notification requirements

1. Means of notification: To [BS EN 50131-1](#), Option A.

Ss_75_40_75/278 Supplementary tamper detection

1. Tamper detection of hold-up devices: Required.
2. Tamper detection of detectors and sensors: Required.
3. Tamper detection of junction boxes: Required.

Ss_75_40_75/294 Event recording for grade 4 systems

1. Event recording functions: Faults with transmitting to external receiving company

Products

90-55-10/320 Cable bands Type C

1. Manufacturer: Contractor's choice .
2. Format: Perforated metal bands.
 - 2.1. Material: Steel.
 - 2.2. Protective covering: LSHF.

Pr_60_75_78_85 Supervised premises transceivers

1. Standard: To [BS EN 50136-2](#).
2. Third party certification: [LPS 1277](#).
3. SPT type: Dual path, Ethernet primary and GRPS secondary.
4. Execution: [Pr_75_80_42/605 Installing intrusion and hold-up alarm control and indicating equipment](#).

Pr_65_70_11_12 Cable baskets Type C

1. Standard: To [BS EN 61537](#).
2. Material: 5 mm steel wire.
3. Coating material: Hot dip galvanized.
4. Sizes
 - 4.1. Width: Refer to Design drawings.
 - 4.2. Side height: 105 mm.
5. Features
 - 5.1. Segregation: Refer to drawings
 - 5.2. Protective cover: Not required.
6. Execution: [Pr_65_70_11/630 Installing cable basket Type C](#).

Pr_65_70_11_13 Cable cleats Type B

1. Manufacturer: Contractor's choice .
2. Standard: To [BS EN 61914](#).
3. Format: Contractor's choice .
4. Material: None ferrous metallic.
5. Resistance to impact: Medium.
6. Environmental influences
 - 6.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 6.2. Metallic and composite components: High resistance to corrosion.

Pr_65_70_11_15 Cable ties Type C

1. Standard: To [BS EN 62275](#).
2. Format: Wrap around self-locking releasable.
3. Material: Metal.
4. Contribution to fire : Non-flame propagating.
5. Environmental influences
 - 5.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 5.2. Metallic and composite components: Resistant to corrosion.

Pr_65_70_15_53 Multicore alarm cables

1. Manufacturer: Contractor's choice .
2. Standard: To [BS 4737-3-30](#).
3. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified.
4. Cable type: 1.
5. Conductor
 - 5.1. Sheath: LSHF.
 - 5.2. Colour: White.
 - 5.3. Screen: Aluminium foil.
6. Execution: [Pr_65_70_48/635 Installing low-voltage cables Type D](#);
[Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking Type C](#);
and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type C](#).

Pr_75_80_42_16 Combined passive infrared and microwave detectors

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 50131-2-4](#).
3. Security grading: To [BS EN 50131-1](#), Grade 4.
4. Environmental classification: To [BS EN 50131-1](#), Class II.
5. Mounting: Wall.
6. Range: 360°–15 m.
7. Features: Adjustable sensitivity range and angle of detection
8. Execution: [Pr_75_80_42/630 Installing combined passive infrared and microwave detectors](#).

Pr_75_80_42_28 External intruder alarm sounders

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 50131-4](#).
3. Security grading: To [BS EN 50131-1](#), Grade 4.
4. Environmental classification: Class II
5. Category: Self-powered.
6. Enclosure
 - 6.1. Material: Polycarbonate.
 - 6.2. Body colour: Submit for approval from Architect
 - 6.3. Lens colour: Submit for approval from Architect
7. Strobe: Integral xenon beacon.
8. Status indicators: Alternating LEDs indicating power supply 'On' and 'Tamper/ fault'.

-
9. Sound pressure level (minimum): 95 dB(A) @1m with automatic cut off after 15 minutes.
 10. Execution: [Pr_75_80_42/665 Installing electronic sounders.](#)

Pr_75_80_42_40 Internal electronic intruder alarm sounders

1. Standard: To [BS EN 50131-4](#).
2. Strobe: Integral xenon strobe.
3. Status indicators: Alternating LEDs indicating alarm condition.
4. Sound pressure level (minimum): 75 dB(A) @1m, with automatic cut off after 15 minutes and selectable alternating or continuous tone.
5. Execution: [Pr_75_80_42/665 Installing electronic sounders.](#)

Pr_75_80_42_41 Intruder alarm panels

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 50131-3](#) and [BS EN 50131-6](#).
3. Security grading: To [BS EN 50131-1](#), Grade 4.
4. Environmental classification: To [BS EN 50131-1](#), Class II.
5. Control features
 - 5.1. User input: 32 (2x16) alphanumeric backlit LCD, digital keypad and LED indicating power 'On'.
 - 5.2. Event log capacity (minimum): 250 events.
 - 5.3. Communication interfaces: WAN/ LAN Ethernet module;
Dual com (GSM/ PSTN) module;
and Dual com (GSM/ GRPS) module.
6. Number of zones (minimum): 8.
7. Number of groups (minimum): 8
8. Number of users (minimum): Manufacturer's standard .
9. Execution: [Pr_75_80_42/605 Installing intrusion and hold-up alarm control and indicating equipment.](#)

Pr_75_80_42_42 Intruder alarm remote keypads

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 50131-3](#) and [BS EN 50131-6](#).
3. Security grading: To [BS EN 50131-1](#), Grade 4.
4. Environmental classification: To [BS EN 50131-1](#), Class II.
5. Control features
 - 5.1. User input: 32 (2x16) alphanumeric backlit LCD, digital keypad and LED indicating power 'On'.
 - 5.2. Setting and unsetting: Via PIN and Via proximity card.
 - 5.3. Operation: Full system control.
 - 5.4. Communication interfaces: Manufacturer's standard .
6. Enclosure: Suitable for flush mounting.
7. Execution: [Pr_75_80_42/610 Installing intrusion and hold-up alarm remote keypads.](#)

Pr_75_80_42_67 Protective switches

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 50131-2-6](#).
3. Security grading: To [BS EN 50131-1](#), Grade 4.

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4. Environmental classification: To [BS EN 50131-1](#), Class II.
 5. Device type: Magnetic reed switch.
 6. Circuit configuration: Contractor's choice .
 7. Material: Plastics.
 8. Mounting: Surface.
 9. Execution: [Pr_75_80_42/675 Installing protective switches](#).

Execution

Pr_65_70_11/630 Installing cable basket Type C

1. Standards: In accordance with [BS 7671](#) and [IET Guidance Note 1](#).
2. Joints: Cut adjacent cross basket wires. Make smooth any burrs or edges.
3. Accessories: Form on site and connect with basket manufacturer's coupling components.
4. Fire barriers: Provide where required to maintain fire performance of fabric.
5. Support
 - 5.1. Fixing arrangement: Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
 - 5.2. Clearance from building fabric (minimum): 20 mm.
6. Components: Avoid contact between dissimilar metals.
7. Routing of cable basket: Submit drawings showing the proposed routes.

Pr_65_70_48/635 Installing low-voltage cables Type D

1. Standard: In accordance with [BS 7671](#).
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Preparation: Store cables above 5°C for 24 hours before installation.
Clear cable path of debris.
4. Installation temperature (minimum): 5°C.
5. Cables: Install in one length. Dress cables flat, free from twists, kinks and strain.
6. Cable pulling: Do not overstress. Prevent kinks and twisting of the cable.
7. Cable protection: Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. Concealed cable runs to wall accessories: Run vertically from the accessory.
9. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.
10. Jointing and termination
 - 10.1. Final circuit cables: At electrical accessories only.
 - 10.2. Core connections: Using compression lugs to equipment without integral clamping terminals.
 - 10.3. Terminating cables when not using glands: Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking Type C

1. Cable installation: Orderly and capable of being withdrawn.
2. Single core wiring: Arrange using the loop-in method.
3. Cables within trunking: Tie at 2 m intervals for cables of the same circuit reference. Label ties with circuit reference number at 10 m intervals.

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4. **Cables in vertical conduit:** Provide cable clamps in accessible conduit boxes at 5 m intervals.
 5. **Extra-low-voltage cables:** Install within a separate partition from low voltage cables where installed in multi compartment trunking.

Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type C

1. **Cabling:** Install when cable supports are complete.
2. **Position:** Place single and multi-core cables side by side.
3. **Fastening**
 - 3.1. **Fastenings generally:** Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed. Cleat all cables on riser sections.
 - 3.2. **Submain cables <95 mm²:** [90-55-10/320 Cable bands Type C](#). Cleat for riser sections
 - 3.2.1. Spacing (maximum): 600 mm.
 - 3.3. **Submain cables >95 mm²:** [Pr_65_70_11_13 Cable cleats Type B](#).
 - 3.3.1. Spacing (maximum): 600 mm.
 - 3.4. **Final circuit cabling:** [Pr_65_70_11_15 Cable ties Type C](#).
 - 3.4.1. Spacing (maximum): 600 mm.
 - 3.5. **Extra-low-voltage, communications and fibre-optic cabling:** [Pr_65_70_11_15 Cable ties Type C](#).
 - 3.5.1. Spacing (maximum): 600 mm.

Pr_75_80_42/605 Installing intrusion and hold-up alarm control and indicating equipment

1. **Standard:** In accordance with [DD CLC/TS 50131-7](#).
2. **Position:** Refer to design drawing.
3. **Fixing equipment:** Fix independently of wiring installation with zinc electroplated fasteners.
4. **Orientation:** Accurate and square to vertical and horizontal axes. Align control panels with adjacent items of switchgear and accessories on the same horizontal axis.
5. **Main power supply:** From an unswitched fused connection unit. Permanently wire with a dedicated circuit from the building's main low voltage switchboard.

Pr_75_80_42/610 Installing intrusion and hold-up alarm remote keypads

1. **Mounting:** Recessed. Refer to drawings for locations
2. **Height (finished floor level to underside of equipment):** Refer to architects setting out drawings

Pr_75_80_42/630 Installing combined passive infrared and microwave detectors

1. **Mounting:** Surface mounted. Refer to drawings for locations
2. **Height (finished floor level to underside of equipment):** Corner of room

Pr_75_80_42/665 Installing electronic sounders

1. **Mounting:** Submit to Architect for approval
2. **Height (finished floor level to underside of equipment):** Submit to Architect for approval

Pr_75_80_42/675 Installing protective switches

1. **Mounting:** Surface mounted. Prior to design completion review with Architect to ensure coordination with finishes

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2. Height (finished floor level to underside of equipment): Prior to design completion review with Architect to ensure coordination with finishes

Ss_75_40_75/620 Installing intrusion and hold-up alarm systems

1. Standards: To [DD CLC/TS 50131-7](#).

System completion

Ss_75_40_75/810 Testing and commissioning intrusion and hold-up alarms systems

1. Standard: To [DD CLC/TS 50131-7](#).
2. System commissioning agent: Specialist Security Sub Contractor.
3. Notice before commencing tests (minimum): 5 days
4. Cable testing
 - 4.1. Insulation resistance: Submit results.
 - 4.2. Earth continuity: Submit results.
5. Charger: Verify operation.
6. Detection devices: Verify the operation, and adjust to provide maximum coverage.
7. Device voltage: Submit details of the voltage at powered devices.
8. Local warning devices: Verify operation.
9. Remote signalling: Verify operation.
10. Standby supply: Verify operation in the event of a mains failure. Check capacity and submit results.
11. Tamper detection: Verify operation.
12. Timers: Set up and adjust entry and exit timers.
13. User codes: Set up and commission.

Ss_75_40_75/820 Documentation

1. Standard: To [DD CLC/TS 50131-7](#).
2. Operating and maintenance instructions
 - 2.1. Scope: Submit for the system giving optimum settings for controls.
 - 2.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 2.3. Format: A4 Paper and electronic copies.
 - 2.4. Number of copies: Two.
3. Logbook: Hardback cover embossed 'INTRUDER AND HOLD-UP ALARM SYSTEM LOGBOOK' with A4 lined paper, minimum 100 pages.
4. Number of copies: Two.
5. Record drawings
 - 5.1. Content: General arrangement drawings showing the location of all control and indicating equipment, remote key pads, detectors, sounders, visual indicators, protective switches and any associated power supply and For all control cabling, the cable origin, circuit designation, route from control and indicating equipment to detectors, sounders, keypads, and protective switches. Include conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
 - 5.2. Format: Electronic drawing.
 - 5.3. Number of copies: Two.

6. Submittal date: At handover.

Ss_75_40_75/860 System soak testing

1. **Soak test:** Undertake when construction works are complete, but before handover and before connection to a remote alarm receiving centre.
2. **Period:** 7 days.
3. **Re-test after remedial works:** Required.

Ss_75_40_75/870 Standby battery testing

1. **Mains power supply:** Isolate.
2. **Quiescent mode:** Measure current supplied by standby source when intrusion and hold-up alarm system is operating in the quiescent mode. Submit results.
3. **Alarm mode:** Measure current supplied by standby source when intrusion and hold-up alarm system is operating in the alarm mode. Submit results.

Ω End of System

Ss_75_50_08_47 **Lockdown systems**

Systems

Ss_75_50_08_47 Lockdown systems

1. Description: HRP to confirm if critical or incident alarm is required to the building.

Ω End of System

Ss_75_50_11_27

Emergency voice communication systems

Systems

Ss_75_50_11_27 Emergency voice communication systems

1. System performance: [Ss_75_50_11/220 Design of emergency voice communication systems](#); [Ss_75_50_11/230 Integration with other alarm and security systems](#)
2. System manufacturer: Submit proposals
3. Equipment interconnectivity: [Pr_65_70_48_29 Fire-resistant screened \(LSHF\) cables](#)
4. Control and indicating equipment: [Pr_75_75_94_22 Disabled refuge master stations](#); [Pr_75_75_94_23 Disabled refuge outstations](#); [Pr_75_80_30_30 Fire alarm sounders](#); [Pr_75_80_30_97 Visual alarm signal devices](#)
5. Containment: [Pr_65_70_11_17 Cable trays](#)
6. Execution: [Ss_75_50_11/640 Installing emergency voice communication systems](#)
7. System completion: [Ss_75_50_11/815 Testing and commissioning emergency voice communication systems](#); [Ss_75_50_11/835 Documentation for emergency voice communication systems](#)

System performance

Ss_75_50_11/220 Design of emergency voice communication systems

1. System designer: System manufacturer.
2. Design: Complete the design of the emergency voice communication system in accordance with [BS 5839-9](#) and [BS 7671](#).
3. Proposals: Submit detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_75_50_11/230 Integration with other alarm and security systems

1. Systems to be integrated: Fire detection and alarm systems.

Products

See [90-55-10/320 Cable bands](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11_13 Cable cleats](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11_15 Cable ties](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

See [Pr_65_70_11_17 Cable trays](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_48_29 Fire-resistant screened \(LSHF\) cables](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

Pr_75_75_94_22 Disabled refuge master stations

1. Manufacturer: Submit proposals
2. Standard: In accordance with [BS 5839-9](#).
3. Communication interface: Telephone handset.
4. Accessories: None.
5. Execution: [Pr_75_75_94/630 Installing disabled refuge master stations](#)

Pr_75_75_94_23 Disabled refuge outstations

1. Manufacturer: Submit proposals
2. Standard: In accordance with [BS 5839-9](#), type B.
3. Accessories: None.
4. Execution: [Pr_75_75_94/640 Installing disabled refuge outstations](#)

Pr_75_80_30_30 Fire alarm sounders

Shared by: [Ss_75_50_28_29 Fire detection and alarm systems](#)

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 54-3](#) and To [BS EN 54-17](#).
3. Third-party certification: [LPCB](#) approved.
4. Sounder type: Electronic sounder.
5. Rated voltage: Contractor's choice .
6. Sound patterns: In accordance with [BS 5839-1](#).
7. Sound pressure level (minimum): 85 dBA at 3 m.
8. Integral beacon: Required where identified on the drawings
9. Mounting: Refer to drawings for mounting type and location
10. Execution: [Pr_75_80_30/640 Installing sounders](#).

Pr_75_80_30_97 Visual alarm signal devices

1. Standard: To [BS EN 54-23](#).
2. Third-party certification: [LPCB](#)-approved.
3. Enclosure protection: To [BS EN 54-23](#), A.
4. Body colour: Red.
5. Lens colour: Red.
6. Execution: [Pr_75_80_30/650 Installing visual alarm devices](#)

Execution

See [Pr_65_70_11/621 Installing cable tray and cable ladder](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/650 Multiple cable runs](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/661 Cable support zones](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_48/635 Installing low-voltage cables](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

See [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket](#) in [Ss_70_30_45_45 Low-voltage distribution systems](#)

Pr_75_75_94/630 Installing disabled refuge master stations

1. Standard: In accordance with [BS 5839-9](#).
2. Mounting arrangement: Wall.

Pr_75_75_94/640 Installing disabled refuge outstations

1. Standard: In accordance with [BS 5839-9](#).
2. Power supply: Derive from local final circuit and connect via unswitched fused connection units.

Pr_75_80_30/640 Installing sounders

1. Circuit wiring: Wire all fire alarm sounders on a ring circuit.

Pr_75_80_30/650 Installing visual alarm devices

Ss_75_50_11/640 Installing emergency voice communication systems

1. Standards: In accordance with [BS 5839-9](#) and [BS 7671](#).

System completion

Ss_75_50_11/815 Testing and commissioning emergency voice communication systems

1. Standards: In accordance with [BS 5839-9](#) and [BS 7671](#).
2. Notice before commencing commissioning: 24 hours.
3. Controls: Verify operation.
4. Alarm signalling: Verify operation.
5. Results: Submit.
6. Certificates of calibration for meters and instruments: Submit.

Ss_75_50_11/835 Documentation for emergency voice communication systems

1. Operating and maintenance instructions
 - 1.1. Scope: Submit for the system giving optimum settings for controls.
 - 1.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use) method of operation and control, and cleaning and maintenance requirements.
 - 1.3. Format: Electronic.
2. Record drawings
 - 2.1. Content: General arrangement drawings showing the location of all outstations, master stations, sounders, visual alarm signal devices and power supply units. Schematic diagram showing all control cabling, the cable origin, route from power supply units to master stations and outstations, sounders, visual alarm signal devices. Include conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
 - 2.2. Format: Electronic drawings.
3. Test certificates
 - 3.1. Installation certificate: Submit two copies in accordance with [BS 5839-9](#), annex D.2.
 - 3.2. Commissioning certificate: Submit two copies in accordance with [BS 5839-9](#), annex D.3.
4. Submittal date: At handover.

Ω End of System

Ss_75_50_28_29

Fire detection and alarm systems

Systems

Ss_75_50_28_29 Fire detection and alarm systems

1. Description: Fire Alarm system to interface with site-wide system, incumbent engineers to advise.
2. System performance: [Ss_75_50_28/210 Design of fire detection and alarm systems in non-domestic premises](#)
[Ss_75_50_28/230 Performance of fire detection and alarm systems](#)
3. System manufacturer: Submit proposals .
4. System type: Addressable.
5. Detection devices
 - 5.1. Atmosphere: Normal.
 - 5.2. Types: [Pr_75_80_30_50 Manual call points](#) and [Pr_75_80_30_65 Point smoke detectors](#).
6. Equipment interconnectivity: [Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free \(LSHF\) cables Type A](#).
7. Cable containment: [Pr_65_70_11_17 Cable trays Type A](#) and [Pr_65_70_11_71 Rigid conduit](#).
8. Concealed installation: Required.
9. Internal alarms
 - 9.1. Primary: [Pr_75_80_30_30 Fire alarm sounders](#)
10. System accessories:
[Pr_75_80_30_71 Remote indicators](#)
11. Execution: [Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises](#)
[Ss_75_50_28/630 Installing cabling for fire detection and alarm systems in non-domestic premises](#)
12. System completion: [Ss_75_50_28/805 System information](#)
[Ss_75_50_28/806 Device identification and testing](#)
[Ss_75_50_28/807 Standby battery testing](#)
[Ss_75_50_28/808 System soak testing](#)
[Ss_75_50_28/809 Measurement of sound pressure levels](#)
[Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems in non-domestic premises](#)
[Ss_75_50_28/820 Documentation for fire detection and alarm systems in non-domestic premises](#)
[Ss_75_50_28/830 Spares and consumables](#).

System performance

Ss_75_50_28/210 Design of fire detection and alarm systems in non-domestic premises

1. System designer: LPCB LPS 1014 Certified Specialist Sub-Contractor
2. Standards: Complete the design of the fire detection and alarm system in accordance with [BS 5839-1](#).
3. Category: Varies and to be in line with the building fire strategy
4. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.
5. System design certificate: Submit with design proposals.

Ss_75_50_28/230 Performance of fire detection and alarm systems

1. Spare system capacity: 10% of installed detection devices and One spare detection loop.
2. Number of devices per zone (maximum): As Manufacturer recommendations.

Products

90-55-10/320 Cable bands Type B

1. Manufacturer: Contractor's choice .
2. Format: Perforated metal bands.
 - 2.1. Material: Steel.
 - 2.2. Protective covering: LSHF.

Pr_65_70_11_13 Cable cleats Type A

1. Manufacturer: Contractor's choice .
2. Standard: To [BS EN 61914](#).
3. Format: Contractor's choice .
4. Material: None ferrous metallic.
5. Resistance to impact: Medium.
6. Environmental influences
 - 6.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 6.2. Metallic and composite components: High resistance to corrosion.

Pr_65_70_11_15 Cable ties Type B

1. Standard: To [BS EN 62275](#).
2. Format: Wrap around self-locking releasable.
3. Material: Metal.
4. Contribution to fire : Non-flame propagating.
5. Environmental influences
 - 5.1. Non-metallic and composite components: Resistant to ultraviolet light.
 - 5.2. Metallic and composite components: Resistant to corrosion.

Pr_65_70_11_17 Cable trays Type A

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 61537](#).
3. Material: Metal.
4. Resistance against flame propagation: Non flame propagating.
5. Electrical properties
 - 5.1. Continuity characteristics: With electrical continuity.
 - 5.2. Conductivity characteristics: With electrical conductive system component.
6. Coating material: Hot dip galvanized.
7. Execution: [Pr_65_70_11/621 Installing cable tray and cable ladder](#);
[Pr_65_70_11/650 Multiple cable runs](#);
and [Pr_65_70_11/661 Cable support zones](#).

Pr_65_70_11_30 Flexible conduit

1. Standards: To [BS EN 61386-23](#).

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2. Material: Metallic.
 3. Mechanical properties
 - 3.1. Resistance to compression: Medium.
 - 3.2. Resistance to impact: Medium.
 4. Resistance to bending: Flexible.
 5. Ingress protection (minimum): To [BS EN 60529](#), IP x4.
 6. Resistance to corrosion: Medium/ high composite protection – Class 2 inside; class 4 outside.
 7. Tensile strength: Medium.
 8. Suspended load capacity: Medium.
 9. Sizes (OD): Contractor's choice .
 10. Execution: ;
[Pr_65_70_11/765 Conduit, trunking and ducting zones Type H](#);
and [Pr_65_70_11/715 Installing pliable and flexible conduit](#).

Pr_65_70_11_71 Rigid conduit

1. Manufacturer: Contractor's choice .
2. Standards: To [BS EN 61386-21](#).
3. Material: Metallic.
4. Mechanical properties
 - 4.1. Resistance to compression: Medium.
 - 4.2. Resistance to impact: Medium.
5. Resistance to bending: Rigid.
6. Ingress protection (minimum): To [BS EN 60529](#), IP x4.
7. Resistance to corrosion: Medium/ high composite protection - Class 2 inside; class 4 outside.
8. Tensile strength: Medium.
9. Suspended load capacity: Medium.
10. Sizes (OD): Contractor's choice .
11. Execution: [Pr_65_70_11/721 Installing rigid metallic conduit Type B](#);
[Pr_65_70_11/735 Installing conduit connections to equipment Type H](#);
and [Pr_65_70_11/765 Conduit, trunking and ducting zones Type H](#).

Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables Type A

1. Standard: To [BS 7629-1](#).
2. Third-party certification: British Approvals Service for Cables ([BASEC](#)) certified and Loss Prevention Certification Board ([LPCB](#)) certified.
3. Fire resistance category: ENHANCED 120.
4. Screen: Aluminium tape.
5. Execution: [Pr_65_70_48/635 Installing low-voltage cables Type C](#) and [Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type B](#).

See [Pr_75_80_30_30 Fire alarm sounders in Ss_75_50_11_27 Emergency voice communication systems](#)

Pr_75_80_30_50 Manual call points

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 54-11](#) and To [BS EN 54-17](#).
3. Third-party certification: [LPCB](#) approved.

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4. Designation: Type A.
 5. Frangible element: Non-resettable.
 6. Integral red visual indicator: Required.
 7. Environmental category: Indoor.
 8. Mounting: Fully recessed.
 9. Protective covers: Required.
 10. Power source: Loop Powered.
 11. Execution: [Pr_75_80_30/630 Installing manual call points.](#)

Pr_75_80_30_65 Point smoke detectors

1. Manufacturer: Submit proposals .
2. Standard: To [BS EN 54-7](#) and To [BS EN 54-17](#).
3. Third-party certification: [LPCB](#) approved.
4. Detector type: Optical.
5. Power source: Loop Powered.
6. Execution: [Pr_75_50_76/620 Installing point detectors.](#)

Pr_75_80_30_71 Remote indicators

1. Manufacturer: Submit proposals .
2. Enclosure
 - 2.1. Material: ABS plastic.
 - 2.2. Colour: White.
3. Lamp: High intensity LED.
4. Lens
 - 4.1. Material: Polycarbonate.
 - 4.2. Colour: Clear.
5. Execution: [Pr_75_80_30/670 Installing remote indicators.](#)

Execution

See [Pr_65_70_11/621 Installing cable tray and cable ladder](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/650 Multiple cable runs](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

See [Pr_65_70_11/661 Cable support zones](#) in [Ss_70_30_80_35 Hardwired low-voltage small power systems](#)

Pr_65_70_11/700 Installing conduit, trunking and ducting Type B

1. Standards: To [BS 7671](#) and in accordance with [IET Guidance Note 1](#).
2. Preparation: Cut square. Remove burrs and sharp edges to make smooth.
3. Protection of metallic conduit, trunking and ducting
 - 3.1. Joints and ends: Remove grease, oil, dirt and rust before applying protective paint. Paint immediately following installation.
 - 3.2. Protective paint
 - 3.2.1. Generally: Compatible with conduit, trunking and ducting finish.
 - 3.2.2. Type: Match factory finish.

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4. **Cross-sectional area:** Maintain throughout the conduit, trunking and ducting length.
 5. **Arrangement:** Position vertically and horizontally in line with equipment served, and parallel with building lines.
 6. **Distance from other services running parallel (minimum)**
 - 6.1. Generally: 150 mm.
 - 6.2. Above radiators: 1000 mm.
 7. **Drainage of conduit, trunking and ducting:** Locate drainage outlets at lowest points in conduit, trunking and ducting installed externally, and where condensation may occur.
 8. **Fire barriers:** Provide to maintain integrity of fire compartments.
 9. **Rewireable installations:** Enable rewiring from accessible boxes or accessories only.
 10. **Support:** Independently fix and support conduit, trunking and ducting from building structure.
 11. **Cleaning:** Clean insides of conduit, trunking and ducting before installing cables.
 12. **Cabling:** Install when conduit, trunking and ducting enclosure is complete.
 13. **Submittals:** Submit manufacturer's technical information. Submit drawings showing the proposed routes of conduit, trunking and ducting and the location of service outlets.

Pr_65_70_11/710 Installing conduit generally Type A

1. **Fixing:** Fix securely. Fix boxes independently of conduit.
2. **Changes of direction:** Conduit boxes or bends site formed by machine. Do not use elbows, tees or inspection bends.
3. **Joints**
 - 3.1. Generally: Manufacturer's jointing fittings.
 - 3.2. Number of joints: Minimize.
 - 3.3. Lengths of conduit: Maximize.
 - 3.4. Open ends: Plug.
 - 3.5. **At movement joints in structure:** Manufactured expansion coupling. Install adaptable boxes on both sides of joint at a maximum distance of 300 mm.
4. **Connections to boxes, trunking, equipment and accessories:** Screwed couplings with rubber bushes at open ends.
5. **Conduit boxes**
 - 5.1. Generally: Install flush with finished surfaces. Provide extension rings if required.
 - 5.2. Fixing screws: Countersunk, or round-headed screws.
 - 5.3. Number of fixings (minimum): Two.
 - 5.4. Lids: Fasten with brass slot pan head screws.
6. **Rear outlet boxes:** Locate where surface conduits pass through walls to external equipment.
7. **Draw-in boxes**
 - 7.1. Spacing (maximum): 10 m.
 - 7.2. Number of bends between draw-in boxes (maximum): Two.
 - 7.3. Floors: Do not install draw-in boxes in floors.
8. **Conduit in walls:** Avoid concealed horizontal runs.
9. **Suspended ceiling installations:** Fasten outlet boxes to structure above ceiling.

Pr_65_70_11/715 Installing pliable and flexible conduit

1. **General requirements:** [Pr_65_70_11/710 Installing conduit generally Type A](#) and [Pr_65_70_11/700 Installing conduit, trunking and ducting Type B](#).
2. **Joints:** Push fit.

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3. Connections to trunking: Female adaptors and externally screwed brass bushes.
 4. Connections to equipment: Flange mount.

Pr_65_70_11/721 Installing rigid metallic conduit Type B

1. General requirements: [Pr_65_70_11/710 Installing conduit generally Type A](#) and [Pr_65_70_11/700 Installing conduit, trunking and ducting Type B](#).
2. Fixings: Distance saddle;
Saddle;
and Spacer bar saddle.
3. Joints: Screwed.
4. Threaded conduits: Tightly screw to ensure electrical continuity, with no thread showing.
5. Conduit connections to boxes and items of equipment, other than those with threaded entries: Earthing coupling with male brass bush and protective conductor.

Pr_65_70_11/735 Installing conduit connections to equipment Type H

1. General requirements: [Pr_65_70_11/710 Installing conduit generally Type A](#) and [Pr_65_70_11/700 Installing conduit, trunking and ducting Type B](#).
2. Surface mounted equipment
 - 2.1. Concealed conduit: Conceal the final connection.
 - 2.2. Exposed conduit: Contain the final connection from the conduit box within flexible metal conduit.
3. Equipment subject to vibration: Flexible metal conduit of adequate length to facilitate removal of equipment for maintenance. Final termination in swivel connectors.
4. Connections to external equipment: [Pr_65_70_11_30 Flexible conduit](#).

Pr_65_70_11/765 Conduit, trunking and ducting zones Type H

1. General requirements: [Pr_65_70_11/700 Installing conduit, trunking and ducting Type B](#).
2. Ceiling voids: Provide clear distance of 150 mm (minimum) between underside of any conduit, trunking or trunking and the topside of ceiling.
 - 2.1. Clear distance between underside of conduit, trunking and ducting and topside of ceiling (minimum): 150 mm.

Pr_65_70_48/635 Installing low-voltage cables Type C

1. Standard: In accordance with [BS 7671](#).
2. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
3. Preparation: Store cables above 5°C for 24 hours before installation.
Clear cable path of debris.
4. Installation temperature (minimum): 5°C.
5. Cables: Install in one length. Dress cables flat, free from twists, kinks and strain.
6. Cable pulling: Do not overstress. Prevent kinks and twisting of the cable.
7. Cable protection: Cables passing through walls and floors to be sleeved with conduit or pipeduct to a minimum of 300 mm. Bush at both ends. Ensure that appropriate fire stopping materials are used to maintain the original fire integrity of the wall or floor around the penetration.
8. Concealed cable runs to wall accessories: Run vertically from the accessory.
9. Distance from other services running parallel (minimum): 150 mm. Position cables below heating pipes.
10. Jointing and termination
 - 10.1. Final circuit cables: At electrical accessories only.

10.2. **Core connections:** Using compression lugs to equipment without integral clamping terminals.

10.3. **Terminating cables when not using glands:** Take sheathing of cables into accessory boxes and equipment and protect against abrasion with grommets.

Pr_65_70_48/735 Cable installation on channel cable supports, cable tray, cable ladder and cable basket Type B

1. **Cabling:** Install when cable supports are complete.
2. **Position:** Place single and multi-core cables side by side.
3. **Fastening**
 - 3.1. **Fastenings generally:** Secure cables, do not indent sheaths. Position to enable any submain cable to be individually removed. Cleat all cables on riser sections.
 - 3.2. **Submain cables <95 mm²:** [90-55-10/320 Cable bands Type B](#). Cleat for riser sections
 - 3.2.1. Spacing (maximum): 600 mm.
 - 3.3. **Submain cables >95 mm²:** [Pr_65_70_11_13 Cable cleats Type A](#).
 - 3.3.1. Spacing (maximum): 600 mm.
 - 3.4. **Final circuit cabling:** [Pr_65_70_11_15 Cable ties Type B](#).
 - 3.4.1. Spacing (maximum): 600 mm.
 - 3.5. **Extra-low-voltage and fibre-optic cabling:** [Pr_65_70_11_15 Cable ties Type B](#).
 - 3.5.1. Spacing (maximum): 600 mm.

Pr_75_50_76/620 Installing point detectors

Pr_75_80_30/630 Installing manual call points

1. **Position:** Refer to design drawing.
2. **Mounting height:** Same level as light switches in area of location.
3. **Test key:** Locate to allow easy test operation.
4. **Labelling**
 - 4.1. **Type:** Face engraved rigid plastic laminate.
 - 4.2. **Background:** White.
 - 4.3. **Lettering:** Red, identifying the manual call point address.

See [Pr_75_80_30/640 Installing sounders](#) in [Ss_75_50_11_27 Emergency voice communication systems](#)

Pr_75_80_30/670 Installing remote indicators

1. **Concealed detection devices:** Install individual LED indicators.

Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises

1. **Standard:** In accordance with [BS 5839-1](#).

Ss_75_50_28/630 Installing cabling for fire detection and alarm systems in non-domestic premises

1. **General requirements:** [Ss_75_50_28/610 Installing fire detection and alarm systems in non-domestic premises](#).
2. **Standard:** In accordance with [BS 7671](#).

3. **Cable route:** Segregate from other cabling. Where installed in trunking, locate in a dedicated fire cabling compartment.
4. **Cable topology:** Loop circuits without spurs or tees.
5. **Mechanical protection:** Basket / Conduits.
6. **Fastening cables**
 - 6.1. **To building fabric:** Metal P-clips with red plastic coating.
 - 6.2. **To cable supports:** Metal bands with red plastic coating.
7. **Cables passing through the building fabric:** Sleeve and seal to prevent transmission of gas and dust.
8. **Jointing:** At equipment terminals.
9. **Cable terminals:** Use ceramic terminal blocks.
10. **Maximum circuit resistance:** Measure before concealment. Submit results.

System completion

Ss_75_50_28/805 System information

1. **Device list:** Before commissioning, Submit proposals, including proposed device, zone and group names.
2. **Zone diagram:** Before commissioning Submit proposals.

Ss_75_50_28/806 Device identification and testing

1. **Device identification:** Label devices with a unique address corresponding to that used by the CIE. Label non-addressable devices with a unique reference corresponding to that shown on the record drawings.
2. **Device testing:** Verify the operation of each device. Submit a schedule of devices, including the device test methods and results.

Ss_75_50_28/807 Standby battery testing

1. **Mains power supply:** Isolate.
2. **Quiescent mode:** Measure current supplied by standby source when fire detection and alarm system is operating in the quiescent mode. Submit results.
3. **Alarm mode:** Measure current supplied by standby source when fire detection and alarm system is operating in the alarm mode. Submit results.

Ss_75_50_28/808 System soak testing

1. **Soak test:** Undertake when construction works are complete, but before handover.
2. **Period:** 7 days.
3. **Re-test after remedial works:** Required.

Ss_75_50_28/809 Measurement of sound pressure levels

1. **Sound pressure levels:** Measure throughout the building.
2. **Test instrument**
 - 2.1. **Standard:** To [BS EN 61672-1](#).
 - 2.2. **Setting:** Slow response, weighting A.
3. **Doors:** Close before measuring sound pressure levels.
4. **Results:** Submit electronic layout drawing showing location of measurements with results.

Ss_75_50_28/810 Testing and commissioning fire detection and alarm systems in non-domestic premises

1. System commissioning agent: Fire alarm specialist.
2. Standard: In accordance with [BS 5839-1](#).
3. Notice before commencing tests (minimum): Two weeks.

Ss_75_50_28/820 Documentation for fire detection and alarm systems in non-domestic premises

1. Standard: In accordance with [BS 5839-1](#).
2. Operating and maintenance instructions
 - 2.1. Scope: Submit for the system giving optimum settings for controls.
 - 2.2. Product information: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
 - 2.3. Format: A4 Paper and electronic copies.
 - 2.4. Number of copies: Two.
3. Logbook: Submit one copy in accordance with [BS 5839-1](#) Annex F.
4. Record drawings
 - 4.1. Content: General arrangement drawings showing the location of all control and indicating equipment, manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices and Schematic diagram showing all control cabling, the cable origin, device addresses, route from control and indicating equipment to manual call points, detectors, radio transmitters and aerials, sounders, visual alarm signal devices, short circuit isolators, end of line devices, remote indicators, interface units connecting to other equipment, and automatic door hold open devices. Include conductor material and c.s.a, insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
 - 4.2. Drawing format: Electronic drawing.
 - 4.3. Submittal date: At handover.
5. Fire evacuation plan: Submit electronic colour CAD layout.
6. Certification
 - 6.1. Design certificate: Submit two copies in accordance with [BS 5839-1](#) Annex G.1.
 - 6.2. Installation certificate: Submit two copies in accordance with [BS 5839-1](#) Annex G.2.
 - 6.3. Commissioning certificate: Submit two copies in accordance with [BS 5839-1](#) Annex G.3.

Ss_75_50_28/830 Spares and consumables

1. Supply the following spares
 - 1.1. Frangible elements for manual call points: Eight.
 - 1.2. Detectors: Two of each type.
2. Printer ink and paper roll: Replace immediately before handover.

Ω End of System

Ss_80_50_60_26

Electric passenger and goods-passenger lift systems

Systems

Ss_80_50_60_26 Electric passenger and goods-passenger lift systems

1. Description: Refer to the Vertical Transportation Specification.
2. Lift type: Passenger lift.
3. Electrical supplies to firefighters' and evacuation lifts
 - 3.1. Primary source: PB-1
 - 3.2. Secondary source: Main Busbar
4. Electrical identification: [Pr_40_10_57_23 Electrical diagrams](#)
5. Execution: [Ss_80_50_60/621 Installing passenger and goods-passenger lift systems](#);
[Ss_80_50_60/630 Installing control cabinets for machine room-less lifts](#)
6. System completion: [Ss_80_50_60/810 Testing and commissioning passenger and goods-passenger lift systems](#)

Products

See [Pr_40_10_57_23 Electrical diagrams](#) in [Ss_70_30_25_25 Earthing and bonding systems](#)

Execution

Ss_80_50_60/621 Installing passenger and goods-passenger lift systems

1. Standard: To [BS EN 81-20](#) and [BS EN 81-73](#).
2. Electrical installation: In accordance with [BS 7671](#). In accordance with [BS 9999](#).

Ss_80_50_60/630 Installing control cabinets for machine room-less lifts

1. Alignment: Accurately and square to vertical and horizontal axes.
2. Fixing: Secure, plumb and level.

System completion

Ss_80_50_60/810 Testing and commissioning passenger and goods-passenger lift systems

1. Standards: To [BS EN 81-20](#).
2. Operational tests: Undertake.
3. Ride quality measurement
 - 3.1. Method: In accordance with [BS ISO 18738](#).
 - 3.2. Results: Submit on drawings.

Ω End of System

