Paignton Academy SEND

BSE Specification

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Contents

Ac_10_10_25/120
Demolition

Activities

Ac_10_10_25/120 Demolition

1. Description: The contractor shall allow to following to enable the demolition of the existing huts where the new SEND building will be positioned.
2. Requirement: Trace, disconnect and strip out incoming cold water supply.

   Trace, disconnect and strip out any data and telecoms connections.

   Trace, disconnect and strip out the existing power supply to the huts which is fed from Block D Main LV Panel.

   Employ JN Building services to disconnect the existing fire alarm devices and connection to the hut and remove from site wide system and network.
3. Execution: Ac_10_10_25/625 Services affected by demolition

Execution

Ac_10_10_25/625 Services affected by demolition

1. Description: The services affected by the demolition are noted under the required works. The demolition shall not be carried out until all services have been disconnected and written confirmation has been provided by the appropriate contractor that the services have been disconnected.
2. Private services: Electric
   Water
   Telecoms
   Fire Alarm

Ω End of Activity

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: Supply and install the complete above ground drainage system in accordance with this specification and the tender drawings for both the Steps and SEND building.

   New drainage connections are to be provided from all new outlets, and shall be connected into the below ground drainage system with suitable provision made for the venting of the installation in accordance with BS EN 12056, Building Regulations and Local Authority Requirements.

   The below ground drainage design is to be completed by others. The Contractor shall allow to coordinate the interfaces between the below ground drainage and the above ground drainage.

   Condense connections from mechanical plant shall run back via to new soil stacks as detailed on the construction drawings.
2. System manufacturer: The system manufacturer shall be Wavin/Osma (or equal and approved) unless otherwise stated in this specification
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) above-ground drainage pipes and fittings
     - 3.1.3. Accessories for jointing: Solvent welding cement (PVC-U).
     - 3.1.4. Supports: Pr_20_85_09_01 Above-ground drainage pipe brackets
     - 3.1.5. Fixings: The fixing of the pipework shall be in accordance with the manufacturers requirements and shall be fixed securely in a method appropriate to the installation.
   - 3.2. Large diameter branch discharge pipework
     - 3.2.1. Pipelines and fittings: Pr_65_52_03_87 Unplasticized polyvinyl chloride (PVC-U) above-ground drainage pipes and fittings
     - 3.2.2. Accessories for jointing: Solvent welding cement.
     - 3.2.3. Supports: Pr_20_85_09_01 Above-ground drainage pipe brackets
     - 3.2.4. Fixings: The fixing of the pipework shall be in accordance with the manufacturers requirements and shall be fixed securely in a method appropriate to the installation.
   - 3.3. Discharge stack pipework
     - 3.3.1. Pipelines and fittings: Pr_65_52_03_87 Unplasticized polyvinyl chloride (PVC-U) above-ground drainage pipes and fittings
     - 3.3.2. Accessories for jointing: Solvent welding cement (PVC-U).
     - 3.3.3. Supports: Pr_20_85_09_01 Above-ground drainage pipe brackets
     - 3.3.4. Fixings: The fixing of the pipework shall be in accordance with the manufacturers requirements and shall be fixed securely in a method appropriate to the installation.
     - 3.3.5. Insulation: The pipework shall be insulated in accordance with the details specified by the acoustician and further detailed within the architect package.
4. Ventilating pipework
   - 4.1. Ventilating stack pipework
     - 4.1.1. Pipelines and fittings: Pr_65_52_03_87 Unplasticized polyvinyl chloride (PVC-U) above-ground drainage pipes and fittings

4.1.2. Accessories for jointing: Solvent welding cement (PVC-U).

4.1.3. Supports: Pr_20_85_09_01 Above-ground drainage pipe brackets

4.1.4. Fixings: The fixing of the pipework shall be in accordance with the manufacturers requirements and shall be fixed securely in a method appropriate to the installation.

5. Fire-stopping
   5.1. Floor penetrations: Certified fire collars shall be provided where plastic pipework above 40mm diameter, penetrates fire compartmentation and subject to approval by the Local Building Control Authority. To be tested to BS EN 1366-3
   5.2. Wall penetrations: Certified fire collars shall be provided where plastic pipework above 40mm diameter, penetrates fire compartmentation and subject to approval by the Local Building Control Authority.To be tested to BS EN 1366-3.
6. System accessories: Pr_65_54_24_02 Air admittance valves; Pr_65_52_61_23 Discharge and ventilating stack terminations
7. Execution: Ss_50_30_04/622 Access to above-ground wastewater drainage systems for testing and maintenance; Ss_50_30_04/614 Installing above-ground wastewater drainage discharge branch pipework
8. System completion: Ss_50_30_04/820 Above-ground wastewater drainage system pipework airtightness test; Ss_50_30_04/840 Above-ground wastewater drainage system pre-handover checks; Ss_50_30_04/830 Above-ground wastewater drainage system siphonage and back pressure tests; Ss_50_30_04/850 Above-ground wastewater drainage system submittals; Ss_50_30_04/810 Testing above-ground wastewater drainage systems

Products

Pr_20_85_09_01 Above-ground drainage pipe brackets

1. Description: Pipe brackets shall be suitable for the pipework being installed and from the same manufacturer
2. Manufacturer: Wavin/Osma (or equal and approved)
3. Pipe location: Internal.
4. Arrangement: Horizontal.
5. Form: Pipe clips. Stand-off pipe clips.
6. Material: HDPE.
7. Finish: To match pipelines.

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

1. Description: All above ground drainage connections from domestic sinks, washbasin and WC shall be run in white solvent welded PVC-U pipework.
   Waste connections shall run back to vertical stacks under gravity and shall be connect via proprietary fixed bosses.
2. Manufacturer: Wavin/Osma (or equal and approved)
3. Standard: To BS EN 1329-1 and the weathering resistance requirements of BS 4514.
4. Third-party product certification: BSI Kitemark-certified.
5. Nominal sizes: DN 32. DN 40. DN 50. DN 110.

   The following pipe diameters shall be used to serve appliances/sanitaryware unless otherwise stated:

   - Wash Hand Basins: 32mm
   - Sinks (general): 40mm
   - Cleaner Sinks: 40mm

- Shower Trays: 40mm
- Baths: 40mm
- Urinal Bowls: 32/40mm
- WC pans: 110mm
- Bidets: 32mm

6. Colour: Grey.
7. Integral accessories: Access fittings. Air admittance valves. Plastics cages. Weathering collars.
8. Execution: Pr_65_52_03/630 Fixing and jointing rainwater and above ground drainage pipes

Pr_65_52_25_75 Sanitary appliance traps

1. Standard: To BS EN 274-1.
2. Third-party product certification:

   BSI Kitemark-certified.
3. Trap:

   Wet traps shall be provided on all outlets with deep seal bottle type traps with a minimum 75mm water seal provided for washbasins and two-piece trapped outlets with a minimum 75mm water seal provided for sinks and appliances to BS EN 274.
4. Material: As branch discharge pipework.
5. Colour: As branch discharge pipework.
6. Size: As branch discharge pipework.
7. Depth of water seal (minimum): 75 mm.

Pr_65_52_61_23 Discharge and ventilating stack terminations

1. Description: Termination of main stacks to atmosphere shall be suitable for the pipework being installed and from the same manufacturer
2. Manufacturer:
3. Arrangement: Perforated cover or cage that does not restrict airflow.

   The termination points shall be a minimum of 900mm above and 3000mm horizontally from any opening and shall be positioned to avoid foul are being drawn into fresh air intake louvres.
4. Material: Plastics, as discharge stack.

Pr_65_54_24_02 Air admittance valves

1. Description: Where approved by Building Control, stacks may terminate inside the building with air admittance valves. Unless otherwise specified, valves should be fitted above the flood level of connected appliances.

   The Contractor shall ensure that air admittance valves are located in areas which have adequate ventilation, are accessible for maintenance and are removable to give access for clearance of blockages.

   All AAVs shall be Type A1 fittings
2. Standard: To BS EN 12380.
3. Material: ABS.
4. Jointing: Solvent weld.
5. Minimum airflow rate: To BS EN 12056-2.

Execution

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): 1.8 m.

       At least at every storey level. Tighten fixings as work proceeds so that every storey is self-supporting.
   - 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.
   - 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.

Ss_50_30_04/614 Installing above-ground wastewater drainage discharge branch pipework

1. Pipework
   - 1.1. Alignment: Fix securely plumb and/ or true to line.
   - 1.2. Branches and low gradient sections: Fix with uniform and adequate falls to drain efficiently.
   - 1.3. Socketed pipes and fittings: Fix with sockets facing upstream.
   - 1.4. Additional supports: Provide as necessary to support junctions and changes in direction.
2. Wall and floor penetrations
   - 2.1. Isolating pipework: Isolate pipework from structure, e.g. with pipe sleeves.
   - 2.2. Masking plates: Fix at penetrations if visible in the finished work.

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

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_04/810 Testing above-ground wastewater drainage systems

1. Dates for testing
   1.1. Notice: Required.
   1.2. Period of notice (minimum): Two working days.
2. Preparation
   2.1. Pipework: Securely fixed and free from obstruction and debris.
   2.2. Traps: Fill with clean water.
3. Testing
   3.1. Water for testing: Supply clean water, assistance and apparatus.
   3.2. Smoke for testing: Do not use.
4. Records of tests: Submit.

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 three minutes.

Ss_50_30_04/830 Above-ground wastewater drainage system siphonage and back pressure tests

1. Method
   1.1. WC pans: Test by flushing.
   1.2. Other appliances: Test by filling to overflow level, then removing the plug.
2. Number of tests: Test each appliance three times. Recharge traps before each test.
3. Self-siphonage testing: Test each appliance individually.
4. Induced siphonage and back pressure testing: Test by discharging the following appliances simultaneously on each stack.

Ss_50_30_04/840 Above-ground wastewater drainage system pre-handover checks

1. Temporary caps: Remove.
2. Permanent blanking caps, access covers, rodding eyes, floor gratings and the like: Secure complete with fixings.

Ss_50_30_04/850 Above-ground wastewater drainage system submittals

1. Content: Include manufacturers' drawings, technical information, calculations, literature, warranties and handling and maintenance instructions.
2. Timing: Hand over at completion.

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: Supply and install the complete domestic installation in accordance with this specification and the tender drawings. All equipment shall be WRAS approved. Brassware and sanitaryware are excluded from this specification - refer to architectural drawings and specification for details.

   The Contractor shall arrange for the local water authority to inspect the proposed construction drawings for regulation approval prior to commencing any works on site, and to inspect the completed installation on site for regulation sign-off. The Contractor shall provide any calculations or documentation as required to satisfy the water authority or building control.

   The Contractor shall not use any flexible rubber hoses on any part of the hot or cold water distribution system. All connections to appliances shall be completed using copper and hard piped directly into all appliances.

   Under no circumstances will dead legs in the system be permitted. Any dead legs introduced accidentally are to be rectified immediately at the Contractor's expense.
2. System performance: Ss_55_70_38/210 Design and detailing hot and cold water systems
   Ss_55_70_38/220 Cold water supply
   Ss_55_70_38/250 Pipeline sizes for hot and cold water systems
3. Arrangement: Mains.
4. Pipelines
   4.1. Below ground: Pr_65_52_63_63 Polyethylene (PE) water pipes and fittings
   4.2. Above ground: Pr_65_52_63_17 Copper pipes
5. Pipeline accessories
   5.1. Accessories: Pr_65_52_61_63 Pipe sleeves; Pr_65_52_61_91 Tundishes
6. Valves
   6.1. Domestic Valves & Ancillaries: Allow for all necessary valves and ancillaries including, but not limited to check valves, isolation valves, strainers, mixing valves, drain cocks and air vents as required to complete the installation and as tender detailed on the tender drawings.

   All valves and ancillaries for use on domestic water systems shall be WRAS-approved.

   Valves shall be installed so that they are easily accessible and positioned with due regard for the existing building fabric, plant layout and accessibility. Isolation valves shall be quarter turn ball valves and valves installed horizontally shall be fitted with the valve spindle vertically upwards unless this will result in the valve handle clashing with adjacent services.

   All appliances shall have water flow regulating valves and pipeline size ball type screwdriver operated isolating valves fitted. Back-flow prevention devices shall be fitted where necessary.

   All sections of pipework that are not self-draining are to be fitted with WRAS approved Type 1 DZR drain cocks to BS 2879 at suitable positions fitted with a blanking plug.

   The Contractor shall supply and install injections points and drain cocks as required for flushing and chlorinating the entire system.
   6.2. Backflow prevention devices: Pr_65_54_95_05 Backflow prevention check valves
   6.3. Isolating valves: Pr_65_54_95_06 Ball valves

6.4. Check valves: Pr_65_54_95_14 Copper alloy check valves
6.5. Regulating valves: Pr_65_54_95_26 Double regulating valves Thermal Circulation Valves
6.6. Mixing valves: Pr_65_54_95_88 Thermostatic mixing valves
6.7. Draining devices: Pr_65_54_95_27 Draining taps
6.8. Accessories: Pr_65_54_93_87 Test points

7. Fire-stopping:

   Individual services penetrations fire-stopping system.

8. Thermal insulation
   8.1. Pipelines: Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation
9. Vibration isolation: Supply equipment indicated to ensure that vibration from equipment is not transmitted to building, other supporting structure, pipework or ductwork. Consider the potential for structure-borne noise transmission as well as vibration.

   The Contractor shall be responsible for the selection and performance of all anti-vibration isolation material to satisfy the design requirements.

10. Outlets: Refer to sanitary fixtures as specified by the architect.
11. Plant and equipment identification: Pr_40_10_57_78 Self-adhesive colour pipe bands; Pr_40_10_57_94 Valve identification labels; Pr_40_10_57_51 Mechanical plant and equipment identification labels
12. 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; Ss_55_70_38/660 Flushing hot and cold water systems
13. System completion: Ss_55_70_38/810 Commissioning of hot and cold water supply systems
    Ss_55_70_38/820 Inspection and test records
    Ss_55_70_38/830 Demonstrations
    Ss_55_70_38/840 Documentation
    Ss_55_70_38/850 Water quality tests

System performance

Ss_55_70_38/210 Design and detailing hot and cold water systems

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Standard: To BS 8558 or BS EN 806-2 and in accordance with HSE publication L8: Legionnaires' disease. The control of Legionella bacteria in water systems. Approved Code of Practice and guidance on regulations.
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturer's literature.

Ss_55_70_38/220 Cold water supply

1. Incoming mains water supply: Provide a new mains water connection to the new SEND block, which shall be run from the existing supply serving the Steps building in buried MDPE pipework (or barrier pipe subject to a soil survey report) to the service entry point.

   The Contractor shall balance the incoming mains water supply by installing an appropriate pressure-reducing valve and double check valve, as the tender drawings indicate.

   The Contractor shall be allowed to carry out all trenching works for the main cold water infrastructure.

   The contractor shall supply and install a new sub-meter on the incoming mains water supply.

   The contractor shall undertake a load check on the main incoming water supply. This load check

shall comprise of calculations to demonstrate that the existing utility supplies have sufficient capacity to service the proposed new build. This will include recommendations where necessary for the upgrade of incoming utility supplies to service the works.

2. Type of system: Direct mains fed.
3. Design parameters: To BS EN 806-2.

Ss_55_70_38/250 Pipeline sizes for hot and cold water systems

1. Sizing: Calculate sizes to meet simultaneous demand for the building in accordance with BS EN 806-3.
2. Proposals: Refer to tender drawings for sizes.
3. Performance
   3.1. Water velocity (maximum): 15-50mmØ: <1m/s
   >50mmØ: <1.5m/s

Products

Pr_40_10_57_51 Mechanical plant and equipment identification labels

Shared by: Ss_60_40_36_05 Air source heat pump systems , Ss_65_40_33_51 Mechanical ventilation systems , Ss_55_70_38_20 Direct hot water storage supply systems , Ss_65_40_33_90 Toilet extract ventilation systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Each separate item of plant and equipment shall be clearly identified, which shall correspond to the As Installed Drawing included in the Operation & Maintenance Manual.

   The Contractor shall supply engraved plastic labels which shall be mechanically fixed directly to the plant or equipment or in a suitable adjacent location where this is not possible. Labels shall not affect the performance, general operation or access provisions.
2. Material: Face-engraved rigid plastic laminate.
3. Colour
   3.1. Background: White.
   3.2. Lettering: Black.
4. Information to be included: Equipment name.
   Equipment reference number.
5. Execution: Pr_40_10_57/611 Installing mechanical plant and equipment identification

Pr_40_10_57_78 Self-adhesive colour pipe bands

Shared by: Ss_60_40_36_05 Air source heat pump systems , Ss_55_70_38_20 Direct hot water storage supply systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Regularly spaced along pipeline runs and at items of equipment.
2. Standards: To BS 1710.
3. Identification label: Adhesive colour bands.
4. Execution: Pr_40_10_57/660 Installing identification on pipework

Pr_40_10_57_94 Valve identification labels

Shared by: Ss_60_40_36_05 Air source heat pump systems , Ss_55_70_38_20 Direct hot water storage supply systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: All isolating, regulating and control valves shall be clearly identified by a unique reference number on an engraved plastic label.

The reference number shall correspond to the As Installed drawings included in the Operation & Maintenance Manual, and a Valve Chart and Plant Schematic

2. Material: Face-engraved rigid plastic laminate.
3. Label size: 40mm in diameter.
4. Colour
   4.1. Background: White.
   4.2. Lettering: Black.
5. Information: Purpose and reference number.
6. Execution: Pr_40_10_57/630 Installing valve identification labels

Pr_65_52_61_63 Pipe sleeves

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Description: **PIPE SLEEVES THROUGH NON FIRE RATED PARTITIONS / FLOORS**

   Where pipe insulation is not carried through pipe sleeve, cut sleeves from material same as pipe one or two sizes larger than the pipe to allow clearance. Do not use sleeves as pipe supports.

   Where pipe insulation is carried through pipe sleeve, cut sleeves from material same as pipe one or two sizes larger than pipe and insulation to allow clearance. Do not use sleeves as pipe supports.

   Install sleeves flush with building finish. In areas where floors are washed down install with a 100mm protrusion above floor finish.

   PROPRIETARY PIPE SLEEVES THROUGH FIRE RATED PARTITIONS / FLOORS

   Kingspan Safire insulated fire sleeves shall be used in accordance within the manufacturer's instructions where insulated services passes through fire rated partitions in the building fabric.
2. Material: Ensure that the material is compatible with the pipe the sleeve is carrying and with the material the sleeve is penetrating.
3. Form: Manufacturer's standard.

Pr_65_52_61_91 Tundishes

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Description: Provide tundishes for all drains from equipment, located adjacent to equipment, or as indicated, in material to suit piping.
2. Material: Copper sheet.
3. Connections: Diameter to suit drain line.

Pr_65_52_63_17 Copper pipes

Shared by: Ss_60_40_92_94 Underfloor low-temperature hot water heating systems and Ss_55_70_38_20 Direct hot water storage supply systems

1. Description: The Contractor shall include for the supply and installation of all new domestic water pipework to serve all new outlets as detailed on the tender drawings.

   Where hot and cold water pipework run parallel to each other, the cold water pipework shall be installed below the hot water pipework to minimise heat transfer from the hot water.
2. Standard: To BS EN 1057.
3. Third-party certification: WRAS-approved.
4. Grade: R250.

5. Finish: Plain.
   Chrome-plated to BS EN ISO 1456.
6. Execution:

   Pr_65_52_63/635 Brazed joints in copper and copper alloy pipes; Pr_65_52_63/630 Installing copper pipework

Pr_65_52_63_63 Polyethylene (PE) water pipes and fittings

1. Description: All buried pipework shall be MDPE (or barrier pipe subject to the soil survey report) to the service entry point.

   The pipework entry into the building will be fully insulated if installed within 750mm of the building perimeter.
2. Standards
   2.1. Pipes: To BS EN 12201-2. To BS ISO 4427-2, PE 80.
   2.2. Fittings: To BS EN 12201-3. To BS ISO 4427-3, PE 80.
3. Third-party certification: WRAS-approved.
4. Colour: Blue.
5. Execution: Pr_65_52_63/700 Installing buried pipework
   Pr_65_52_63/705 Protection of buried pipework
   Pr_65_52_63/645 Installing plastics pipework

Pr_65_54_93_87 Test points

Shared by: Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Binder points shall be installed for test purposes as per the tender drawings, and in the following instances as a minimum:
   - Upstream and downstream of circulation pumps.
   - Upstream and downstream of energy meters.
   - Flow and return connections to each heating/cooling coil
   - Flow and return connections to each boiler/calorifier/chiller
   - 3 port control valves - adjacent to each port
2. Arrangement: Self-sealing.
3. Material: Brass.
4. Verification
   4.1. Third-party certification: WRAS-approved, where appropriate

Pr_65_54_95_05 Backflow prevention check valves

1. Description: Double check valves for prevention of backflow and contamination of water supplies shall be provided as detailed on the tender drawings.

   Double check valves 50mm size and below shall be of brass/bronze construction.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ

3.2. Telephone: +44 (0)1473 277300
3.3. Web: www.cranefs.com
3.4. Email: enquiries@cranefs.com

4. Product reference: D220W / D220CW Double Check Valve
5. Third party certification: WRAS approved.
6. Standard: To BS EN 10226-2, BS EN 13959 and BS EN 12165.
7. Pressure rating: PN16.
8. Operating temperature: -10 to +85°C.
9. Materials: DZR brass CW602N, Acetal, Brass (BS EN 12165 CW602N, 617N), NBR, EPDM, Stainless steel and Cartridge brass H62.
10. Execution: Pr_65_54_95/610 Installation of valves generally
Pr_65_54_95/615 Installation of backflow prevention devices

Pr_65_54_95_06 Ball valves

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Quarter turn isolation valves shall be provided as detailed on the tender drawings, and as a minimum shall be installed on the incoming supply to the building and on all outlets and appliances.

   Valves shall be located such that they are in an accessible location and can be operated by hand.

   Valves installed horizontally shall be fitted with the valve spindle vertically upwards unless this will result in the valve handle clashing with adjacent services.

   All final connections to appliances shall be provided with WRAS approved screw operated service ball valves with chrome plated body.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ
   3.2. Telephone: +44 (0)1473 277300
   3.3. Web: www.cranefs.com
   3.4. Email: enquiries@cranefs.com
4. Product reference: D171 Ball Valve
5. Material: Bronze, Steel, PVC, EPDM, Aluminium and PTFE.
6. Connections: Taper threaded to BS EN 10226-2 (ISO 7-1).
7. Finish: Hex-Nut (steel plated); Lever (Steel Dacromet Plated); Sleeve (maroon PVC); Ball (chrome plated); Extension stern outer (aluminium); Extension stern inner (steel plated).
8. Standards: To BS EN 1982, BS EN 12164; BS EN 12165; to BS EN 10226-2 (ISO 7-1).
9. Third-party certification: WRAS approved.
10. Operator: Lever.
11. PressureRange: Temperature: -10 to +100°C: 25 bar, Temperature: +120°C: 21.8 bar.
12. Execution: Pr_65_54_95/610 Installation of valves generally

Pr_65_54_95_14 Copper alloy check valves

1. Description: Check valves shall be provided as detailed on the tender drawings, and as a minimum shall be installed downstream of pumps and upstream of electric water heaters.

   Check valves shall be the full size of the service pipe into which they are installed.

   Check valves 50mm size and below shall be of bronze construction.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ
   3.2. Telephone: +44 (0)1473 277300
   3.3. Web: www.cranefs.com
   3.4. Email: enquiries@cranefs.com
4. Product reference: D140W Check Valve Swing Pattern
5. Third party certification: WRAS approved.
6. Standard: To BS EN 10226-2, BS 5154: 1991, BS EN 1982 and BS EN 12164.
7. Pressure rating: PN25.
8. Connections: Taper threaded.
9. Operation: Swing type check valve.
10. Materials: Bronze BS EN 1982 CC491K, Brass BS EN 12164 CW614N, Nitrile rubber and Stainless steel.
11. PressureRange: Temperature: -10 to +85°C: 25 bar.
12. Execution: Pr_65_54_95/670 Installation of check valves

Pr_65_54_95_26 Double regulating valves Thermal Circulation Valves

1. Description: The Contractor shall verify how the existing domestic hot water recirculation system is balanced, and ensure that new pipework is balanced in the same way.

   For the purposes of the tender drawings and this specification, it is assumed that the hot water return is balanced via the use of Thermal Circulation Valves (TCVs) to each outlet to automatically support thermal disinfection.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ
   3.2. Telephone: +44 (0)1473 277300
   3.3. Web: www.cranefs.com
   3.4. Email: enquiries@cranefs.com
4. Product reference: D2890 / D2880 Thermal Circulation Valve
5. Standard: To BS EN 10226-2, BS EN 1982 and BS EN 12164.

6. Material: Bronze BS EN 1982 CC491K, Polypropylene, Nylon 6, DZR Brass BS EN 12164 CW602N, Stainless steel SS EN10088-3 1.4305, EPDM rubber and PTFE.
7. Connections: Taper threaded to BS EN 10226-2.
8. Inlets/outlets diameter: DN15.
9. Pressure: 16 BAR.
10. Maximum temperature: +90°C.
11. ValveOperation:
    - When the set point is pre-set to 57°C, the valve completely opens up to a valve temperature of 52°C.
    - Between 52°C and the set point of 57°C, the valve starts to close. When the set point temperature has been reached, a minimum volume flow is continuously flowing through the circulation system.
    - If the storage temperature is further increased to temperatures greater than 70°C to effect disinfection, the valve increases the flow.
12. Approvals: Water Regulations Advisory Scheme (WRAS).
13. Standard: To BS 7350.
14. Execution: Pr_65_54_95/610 Installation of valves generally

Pr_65_54_95_27 Draining taps

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Drain cocks shall be installed on all items of equipment and at all low points in the pipeline system and adjacent (within 250mm) to valves isolating sub-circuits to enable the whole, or sections of the system, to be drained down.

   Drain cocks shall be fitted clear of pipe insulation and in positions allowing easy operation of the handles.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ
   3.2. Telephone: +44 (0)1473 277300
   3.3. Web: www.cranefs.com
   3.4. Email: enquiries@cranefs.com
4. Product reference: D340 Drain Taps (DN15)
5. Standard: To BS EN 10226-2, BS EN 12165, BS EN 12164 and BS 2879.
6. Size:
7. Arrangement: Type 2.
8. Material: DZR Brass BS EN 12165 CW602N, Brass BS EN 12164 CW614N, EP80 (EPDM-WRAS Approved) and EP70 (EPDM-WRAS Approved).
9. Connections: Threaded joints to BS EN 10226-2 (taper).
10. OperationTemperatureRange: 0 to +110°C.
11. Pressure: 16 BAR.
12. Operator: Lockshield.

13. Approvals: WRAS approved.
14. Execution: Pr_65_54_95/610 Installation of valves generally

Pr_65_54_95_88 Thermostatic mixing valves

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Description: The Contractor shall allow to supply and install Crane Thermostatic Mixing Valves (TMV3) on all wash hand basins.

   A maximum of one outlet shall be connected to each thermostatic valve.

   All thermostatic mixing valves shall be supplied with an integrated filter or an in-line strainer installed upstream of the valve arrangement.

   As part of the commissioning process the Contractor shall allow to carry out flushing of the new domestic installation. During flushing measures shall be taken to prevent the ingress of dirt and debris to the thermostatic mixing valves. A flushing kit provided by the manufacturer or other suitable means of safely flushing the system shall be used.

   Where hot water outlets are not automatically blended, permanent notices should be fixed adjacent to the outlet providing the user with a clear warning of very hot water discharge.
2. Manufacturer: Crane Fluid Systems
3. Contact details
   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ
   3.2. Telephone: +44 (0)1473 277300
   3.3. Web: www.cranefs.com
   3.4. Email: enquiries@cranefs.com
4. Product reference: D1089 Thermostatic Mixing Valve (15 mm)
5. Inlets/outlets diameter: Line size, as per tender drawings.
6. Pressure: 10 BAR.
7. Operating temperature range: +30 to +50°C.
8. Thermostatic mixing valve: Wash Basin (application), maximum mixed temperature 41˚C.

   A maximum draw-off temperature of 43°C will be permitted in the event of a cold water failure.
9. Approvals: WRAS, NSF TMV2 and TMV3.
10. Materials: Chrome plated brass CW602N, POM, EPDM, Stainless steel AISI 304, ABS, PSU, Chrome Plated Brass CW607N, Al alloy, PTFE and Brass CW507L.
11. Execution: Pr_65_54_95/610 Installation of valves generally

Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation

Shared by: Ss_60_40_36_05 Air source heat pump systems , Ss_60_40_92_94 Underfloor low-temperature hot water heating systems , Ss_55_70_38_20 Direct hot water storage supply systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: All new building services shall be fully insulated following the successful installation, testing, commissioning and witnessing of the installation by the Contract Administrator.

   Unless otherwise specified, the following shall be thermally insulated (inclusive of all fittings, etc):

- All piped heating services not forming controllable, useful heating surface
- All piped domestic hot water service services
- All piped cold water services, except where on view in sanitary or kitchen areas
- All piped refrigeration services.
- Piped services at risk of freezing

2. Manufacturer: Kingspan Insulation
3. Contact details
   3.1. Address: Kingspan Insulation Ltd
   Pembridge
   Leominster
   Herefordshire
   United Kingdom
   HR6 9LA
   3.2. Telephone: +44 (0)1544 388601
   3.3. Web: https://www.kingspan.com/gb/en-gb
   3.4. Email: info@kingspaninsulation.co.uk
4. Product reference: Kingspan Kooltherm Pipe Insulation
5. Standard: To BS EN 14314:2009+A1:2013.
6. Form: Pipe section.
7. Thermal conductivity: 0.025 W/m·K at 10°C (37 kg/m³) and 0.045 W/m·K at 10°C (120 kg/m³).
8. Finish: Aluminium.
9. Fire performance: Euroclass RtF BL-s1,d0.
10. Insulation thickness (minimum): 15–100 mm.
11. Vapour barrier
    11.1. Material: Factory-applied aluminium foil vapour barrier facing.
    11.2. Vapour barrier vapour permeability: Low.
12. Protection: For external application the insulation must be covered with a waterproof finish.
13. Execution: Installing phenolic foam insulation on pipelines.
14. Protection: For external application the insulation must be covered with a waterproof finish.

    Where applicable, pipework and fittings shall be finished with a zero permeability self-adhesive vapour barrier suitable for insulation and cladding applications. The barrier shall comprise a multi-layered, self-adhesive material as manufactured by VentureClad Jacketing System (or equal and approved).

    Colour of jacketing system (white/grey) subject to confirmation by Project Administrator/Architect.
15. Density: Depending on Type, 37–120 kg/m³.
16. FM approved: FM Approved per FM Approval Standard 4924 where manufactured and installed in accordance with the details of the FM Approval. Please contact Kingspan technical services for further information.
17. Closed cell content: ≥90%.
18. Execution: Pr_80_77_76/640 Installing phenolic foam insulation on pipelines; Pr_80_77_76/760 Insulation not carried through pipelines supports; Pr_80_77_76/755 Installing at non-loadbearing pipelines supports; Pr_80_77_76/780 Installing vapour barriers; Pr_80_77_76/610 Installing insulation and protection products generally

Execution

Pr_40_10_57/611 Installing mechanical plant and equipment identification

1. Fixing: Adhesive.
   lug and screw.
   Nut and bolt.
2. Position: On equipment.

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.
   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.
4. Direction of flow: Indication arrow.
   Indication arrow and the word FLOW or the letter F.
   Indication arrow and the word RETURN or the letter R.

Pr_65_52_63/610 Pipework installation generally

Shared by: Pr_65_52_63_82 Steel pipes

1. Standard: BESA Technical Report TR/20/1 LTHW heating pipework systems.
   BESA Technical Report TR/20/4 Hot water service.
   BESA Technical Report TR/20/5 Cold water service.
2. Dissimilar metals: Prevent electrolytic corrosion.

Pr_65_52_63/615 Installing pipe fittings

Shared by: Pr_65_52_63_82 Steel pipes

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

Pr_65_52_63/630 Installing copper pipework

1. General requirements: Pr_65_52_63/610 Pipework installation generally; Pr_65_52_63/615 Installing pipe fittings; Pr_65_52_63/690 Spacing of pipework; Pr_65_52_63/710 General inspection and testing
2. Standard: In accordance with CDA publication 88 Copper tube in buildings.
3. Jointing method
   3.1. Accessible joints: Press-fit.
   Push-fit.
4. Expansion loops: Sufficient flexibility shall be built into the insulation to allow for any thermal expansion within the system
5. Anchor
   5.1. Method: Two flanges fixed to copper female adaptors.
   5.2. Pipe restraints: Saddle clamps.

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 pipework

1. General requirements: Pr_65_52_63/610 Pipework installation generally
2. Pipe material: Polyethylene.
3. Jointing method: Electrofusion.
4. Anchor:

Pr_65_52_63/690 Spacing of pipework

Shared by: Pr_65_52_63_82 Steel pipes

1. Minimum clearance between insulated pipework and
   1.1. Wall finish: 25mm
   1.2. Ceiling finish or soffit: 50mm
   1.3. Floor: 150mm
   1.4. Electrical services: 150mm
   1.5. Adjacent services: 100mm
   1.6. Uninsulated pipework: 75mm
   1.7. Adjacent insulated pipework: 25mm
2. Minimum clearance between uninsulated pipework and
   2.1. Wall finish: 25mm
   2.2. Ceiling finish or soffit: 100
   2.3. Floor: 150mm
   2.4. Electrical services: 150mm
   2.5. Adjacent services: 150mm
   2.6. Adjacent uninsulated pipework: 25mm

Pr_65_52_63/700 Installing buried pipework

1. Depth of cover:

   Minimum 750 mm to prevent frost damage.
2. Setting 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 pipe pressure testing. 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 pipework

1. Earth cover (minimum)
   1.1. Water pipework: In footway: Minimum 750mm cover.
   In carriageway: Minimum 750mm cover.
   Off the public highway: Minimum 900mm cover, 1200 mm maximum where practicable.

2. Protection: Apply an anticorrosive, non-cracking, non-hardening, waterproof sealing tape.
3. Application: After cleaning the pipework, wrap two layers of tape helically around the pipe in opposing directions with 50% minimum overlap.
4. Marker tape: Required.

Pr_65_52_63/710 General inspection and testing

Shared by: Pr_65_52_63_82 Steel pipes

1. Inspection of joints
   1.1. Joints: Cut out, cut open and inspect.
   1.2. Number of joints: Three.
2. Safety precautions: In accordance with HSE Guidance Notes: General Series (GS) GS 4.

Pr_65_54_95/610 Installation of valves generally

Shared by: Pr_65_54_95_75 Safety valves , Pr_65_54_95_89 Thermostatic radiator valves and Pr_65_54_95_26 Double regulating valves

1. Installation: In accordance with BS 6683.
2. Isolation and regulation valves: Provide at equipment and on sub-circuits.
3. Access: Locate valves so they can be readily operated and maintained. Locate next to equipment which is to be isolated.
4. Connection to pipework: Fit with joints that suit the pipe material.

Pr_65_54_95/615 Installation of backflow prevention devices

1. Standard: In accordance with Water Regulations Advisory Scheme Water regulations guide
2. Type BA: In accordance with Water Regulations Advisory Scheme Approved Installation Method: Type BA Device – Verifiable backflow preventer with reduced pressure zone (RPZ valve). Requirements for installation, commissioning and compliance testing of Type BA devices (RPZ valves).

Pr_65_54_95/670 Installation of check valves

1. General requirements: Pr_65_54_95/610 Installation of valves generally
2. Lift type: Install in direction of flow as indicated on the body.
3. Disc type: With spring, fit in any plane. Without spring, fit in vertical plane with flow from bottom to top.
4. Wafer type: Install between flanges. Fit in horizontal plane or vertical upward flow.
5. Split disc: Install between flanges. Fit in horizontal plane or vertical upward flow.

Pr_80_77_76/610 Installing insulation and protection products generally

Shared by: Pr_80_77_76_62 Phenolic foam insulation Ductwork

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. Joints: To BS 5970

2. At fittings: To BS 5970
3. Vapour seal: To BS 5970

Pr_80_77_76/755 Installing at non-loadbearing pipelines supports

1. Insulation: To BS 5970

Pr_80_77_76/760 Insulation not carried through pipelines supports

1. Insulation at supports: To BS 5970

Pr_80_77_76/780 Installing vapour barriers

1. Integrity: To BS 5970

Ss_55_70_38/620 Installing hot and cold water systems generally

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

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

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Standard: To BS 8558 and BS EN 806-4.
2. Notice (minimum): Three days.
3. Pressure: 2 times working pressure.
4. Duration of test: To be maintained for 15 minutes without further pumping.

Ss_55_70_38/660 Flushing hot and cold water systems

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Standard: To BS EN 806-4.
2. Water analysis: Analyse water samples before treatment.
3. Preliminary checks: Thoroughly inspect pipework. Complete pressure tests before cleaning or chemical treatment.
4. Waste products : Neutralize, and dispose of to drain. Preferably direct to manhole.

System completion

Ss_55_70_38/810 Commissioning of hot and cold water supply systems

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Pre-commissioning: In accordance with BSRIA BG 2/2010 and CIBSE Commissioning Code W.
2. Commissioning: In accordance with BS EN 806-4, BSRIA BG 2/2010 and CIBSE Commissioning Code W.

3. Notice (minimum):
4. Equipment: Check and adjust operation of equipment, controls and safety devices.
5. Outlets: Check operation of outlets for satisfactory rate of flow and temperature.

Ss_55_70_38/820 Inspection and test records

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

1. Construction phase reports: Post-installation. System cleanliness. System commissionable.
2. Records for water systems: In accordance with BSRIA BG 2/2010.
3. Record sheets
   3.1. Submission: On completion.
   3.2. Number of copies: Three.

Ss_55_70_38/830 Demonstrations

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

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

Ss_55_70_38/840 Documentation

Shared by: Ss_55_70_38_20 Direct hot water storage supply 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: Paper copy.
   1.4. Number of copies: Three.
2. Record drawings
   2.1. Content: 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. Location of outlets.
   2.2. Format: A1 paper print.
   2.3. Number of copies: Three.
3. Submittal date: At handover.
4. Wholesome water consumption notice: Submit within 30 days.

Ss_55_70_38/850 Water quality tests

Shared by: Ss_55_70_38_20 Direct hot water storage supply systems

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:

Ω End of System

Ss_55_70_38_20
Direct hot water storage supply systems

Systems

Ss_55_70_38_20 Direct hot water storage supply systems

1. Description: Supply and install the complete domestic hot water services installation in accordance with this specification and the tender drawings. All equipment shall be WRAS approved. Brassware and sanitaryware are excluded from this specification.

   The Contractor shall arrange for the local water authority to inspect the proposed construction drawings for regulation approval prior to commencing any works on site, and to inspect the completed installation on site for regulation sign-off. The Contractor shall provide any calculations or documentation as required to satisfy the water authority or building control.

   The Contractor shall not use any flexible rubber hoses on any part of the hot or cold water distribution system. All connections to appliances shall be completed using copper and hard piped directly into all appliances.

   Under no circumstances will dead legs in the system be permitted. Any dead legs introduced accidentally are to be rectified immediately at the Contractor's expense.
2. System performance: Ss_55_70_38/210 Design and detailing hot and cold water systems
3. Storage unit: Pr_60_60_96_28 Electric storage water heaters
4. System: Unvented.
5. Pipelines: Pr_65_52_63_17 Copper pipes
6. Pipeline accessories
   6.1. Expansion devices: Sufficient flexibility shall be built into the insulation to allow for any thermal expansion within the system.

   Controlled movement of pipes shall be by natural flexibility of pipelines using changes of direction and expansion loops.

   Alternatively, where this is not practicable, expansion devices shall be used.
   6.2. Gauges: Pr_65_52_34_66 Pressure gauges; Pr_65_52_34_88 Temperature gauges
   6.3. Accessories: Pr_65_52_61_91 Tundishes; Pr_65_52_61_63 Pipe sleeves
7. Valves
   7.1. Isolating valves: Pr_65_54_95_06 Ball valves
   7.2. Mixing valves: Pr_65_54_95_88 Thermostatic mixing valves
   7.3. Draining devices: Pr_65_54_95_27 Draining taps
8. Fire-stopping: Individual services penetrations fire-stopping system.

   Multiple services penetration fire-stopping system.
9. Thermal insulation
   9.1. Pipelines: Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation
10. Vibration isolation: Supply equipment indicated to ensure that vibration from equipment is not transmitted to building, other supporting structure, pipework or ductwork. Consider the potential for structure-borne noise transmission as well as vibration.

    All items of mechanical equipment including, but not limited to pumps, fans, condensers and air handling units shall have manufacturer supplied anti-vibration mounts.

The Contractor shall be responsible for the selection and performance of all anti-vibration isolation material to satisfy the design requirements

11. Plant and equipment identification: Pr_40_10_57_78 Self-adhesive colour pipe bands; Pr_40_10_57_94 Valve identification labels; Pr_40_10_57_51 Mechanical plant and equipment identification labels; Pr_40_10_57_93 Valve charts and schematics
12. 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; Ss_55_70_38/660 Flushing hot and cold water systems; Ss_55_70_38/630 Installing unvented hot water storage discharge pipes; Ss_55_70_38/670 Disinfection of hot and cold water systems
13. System completion: Ss_55_70_38/880 Maintenance; Ss_55_70_38/810 Commissioning of hot and cold water supply systems; Ss_55_70_38/840 Documentation; Ss_55_70_38/830 Demonstrations; Ss_55_70_38/820 Inspection and test records; Ss_55_70_38/850 Water quality tests; Ss_55_70_38/870 Operating tools; Ss_55_70_38/860 Spares

System performance

See Ss_55_70_38/210 Design and detailing hot and cold water systems in Ss_55_70_38_15 Cold water supply systems

Products

See Pr_40_10_57_51 Mechanical plant and equipment identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_78 Self-adhesive colour pipe bands in Ss_55_70_38_15 Cold water supply systems

Pr_40_10_57_93 Valve charts and schematics

Shared by: Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: As detailed in this specification, valves shall be clearly identified by a unique reference number which shall correspond to a Valve Chart and Plant Schematic which shall be wall mounted in the Plant Room.
2. Material:

   Paper print, glazed frame.
3. Size: A3.
4. Execution: Pr_40_10_57/620 Installing valve charts and schematics

See Pr_40_10_57_94 Valve identification labels in Ss_55_70_38_15 Cold water supply systems

Pr_60_60_96_28 Electric storage water heaters

1. Description: Domestic hot water shall be generated locally by the point-of-use semi-storage electric water heater within the new SEND block.

   The water heaters shall either be mounted at a high level (above the sink) (as detailed on the tender drawings), with suitable access for inspection and maintenance provided.

   The water heaters shall be installed fully in accordance with the manufacturer's recommendations, Approved Document Part G, HSE L8 Approved Code of Practice & Guidance and the Water Supply (Water Fittings) Regulations.
2. Manufacturer: Ariston
3. Contact Details :

   3.1. Address : Ariston Thermo UK Ltd Artisan Building
   Hillbottom Road

High Wycombe
HP12 4HJ

3.2. Telephone : +44 (0)333 240 6666

3.3. Web: www.ariston.co.uk

4. Product : Andris Lux
5. Standards: To BS EN 60335-1 and BS EN 60335-2-21.
6. Third-party certification: WRAS-approved.
7. Arrangement: Single - mains cold water supply
8. Capacity: 6 Litres
9. Rating: 1.5 kW @ 230V
10. Flow rate: To suit draw off requirements.
11. Casing finish: White vitreous enamel.
12. Controls: Adjustable thermostat.
13. Accessories: Water heaters to come complete with the following, to be installed in line with the manufacturer's instructions:
    - KIT A: Expansion vessel and non-return valve
    - KIT B: 3.5bar pressure reducing valve
    - KIT C: Discharge tundish

Pr_65_52_34_66 Pressure gauges

1. Description: Provision for pressure measurement in the pipework system shall be made by installing gauge connectors and pressure gauges.
2. Standard: To BS EN 837-1.
3. Diameter: 100 mm.
4. Scale subdivisions: 20 kPa (0.2 bar) for a maximum scale value of 1000 kPa (10 bar).
5. Material: Black steel case.
6. Connections: 'U' pattern siphon and gauge cock.
7. Execution: Pr_65_52_34/630 Installing pressure gauges

Pr_65_52_34_88 Temperature gauges

1. Description: Provision for temperature measurement in the pipework system shall be made by installing thermometer pockets and thermometers.
2. Standard: To BS EN 13190.
3. Format: Mercury in steel.
4. Diameter: 100.
5. Case: Black steel.
6. Connections: Straight stem.
7. Integral accessories: Thermometer pockets shall be copper alloy, and be of length and diameter to suit the bulbs of thermometers.

See Pr_65_52_61_63 Pipe sleeves in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_61_91 Tundishes in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63_17 Copper pipes in Ss_55_70_38_15 Cold water supply systems

See Pr_65_54_95_06 Ball valves in Ss_55_70_38_15 Cold water supply systems

See Pr_65_54_95_27 Draining taps in Ss_55_70_38_15 Cold water supply systems

See Pr_65_54_95_88 Thermostatic mixing valves in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation in Ss_55_70_38_15 Cold water supply systems

Execution

See Pr_40_10_57/611 Installing mechanical plant and equipment identification in Ss_55_70_38_15 Cold water supply systems

Pr_40_10_57/620 Installing valve charts and schematics

1. Fixing: Plug and screw to wall.
2. Position: Plant room.

See Pr_40_10_57/630 Installing valve identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/660 Installing identification on pipework in Ss_55_70_38_15 Cold water supply systems

Pr_65_52_34/630 Installing pressure gauges

1. Position:

   Secure with metal chain.

See Pr_65_52_63/610 Pipework installation generally in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/615 Installing pipe fittings in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/630 Installing copper pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/635 Brazed joints in copper and copper alloy pipes in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/690 Spacing of pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/710 General inspection and testing in Ss_55_70_38_15 Cold water supply systems

See Pr_65_54_95/610 Installation of valves generally in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/610 Installing insulation and protection products generally in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/640 Installing phenolic foam insulation on pipelines in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/755 Installing at non-loadbearing pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/760 Insulation not carried through pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/780 Installing vapour barriers in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/620 Installing hot and cold water systems generally in Ss_55_70_38_15 Cold water supply systems

Ss_55_70_38/630 Installing unvented hot water storage discharge pipes

1. Fall (minimum): 1 in 80.
2. Discharge
   2.1. Method: Via an air break and tundish.
   2.2. Size: At least the diameter of the outlet of the safety device.
   2.3. Tundish discharge: At least one diameter larger than the outlet of the safety device.
   2.4. Discharge point: Into the foul water drainage system via a waterless drain valve.

See Ss_55_70_38/650 Hydraulic pressure testing of hot and cold water supply systems in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/660 Flushing hot and cold water systems in Ss_55_70_38_15 Cold water supply systems

Ss_55_70_38/670 Disinfection of hot and cold water systems

1. Standard: To BS EN 806-4.
2. Samples for analysis: Provide after disinfection and flushing.

System completion

See Ss_55_70_38/810 Commissioning of hot and cold water supply systems in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/820 Inspection and test records in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/830 Demonstrations in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/840 Documentation in Ss_55_70_38_15 Cold water supply systems

See Ss_55_70_38/850 Water quality tests in Ss_55_70_38_15 Cold water supply systems

Ss_55_70_38/860 Spares

1. Pipeline ancillaries
   1.1. Keys: Two of each type

Ss_55_70_38/870 Operating tools

1. Tools: Supply tools for operation, maintenance and cleaning purposes.
2. Keys: Supply keys for valves and vents.

Ss_55_70_38/880 Maintenance

1. Servicing and maintenance: Undertake for 12 months after completion.

Ω End of System

Ss_60_40_36_05
Air source heat pump systems

Systems

Ss_60_40_36_05 Air source heat pump systems

1. Description: Space heating for the new SEND building shall be achieved by means of a zoned wet system comprising radiators and underfloor heating, fed from a new Monobloc air source heat pump.

   The Contractor shall supply, install and commission the new R32 monobloc air source heat pump system. The Heat pump system is to come equipped with a variable-speed pump as specified by the manufacturer. Max operating pressure of 3 bar.

   Careful consideration needs to be given to plant dimensions to ensure there is sufficient space for installation, servicing and maintenance, as recommended by the equipment manufacturers and in accordance with Health and Safety Regulations.

   Local user control shall be via wall-mounted wired remote controllers and sensors.
2. System performance: Ss_60_40_36/210 Design of heat pump systems; Ss_60_40_36/220 Design parameters
3. System manufacturer: Toshiba R32 Riello Monobloc (or equal and approved)
4. Arrangement: Heating - Underfloor Heating
5. Heat pump type: Pr_70_60_37_04 Air-to-water heat pumps
6. Supplementary equipment: Dual aerator low-loss header and expansion vessels, as indicated on the drawings.
7. Pumps: Supplied by manufacturer.
8. Thermal insulation: Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation
9. Outlets: Low-temperature heating system.
10. Controls: The heat pump system control has wall-mounted hard-wired temperature sensors and a thermostat transfer board, as indicated on the drawing.
11. Plant and equipment identification: Pr_40_10_57_51 Mechanical plant and equipment identification labels; Pr_40_10_57_94 Valve identification labels; Pr_40_10_57_78 Self-adhesive colour pipe bands
12. Execution: Ss_60_40_36/620 Installing heat pump systems
13. System completion: Ss_60_40_36/810 Commissioning of heat pump systems; Ss_60_40_36/820 Performance testing; Ss_60_40_36/830 Inspection and test records; Ss_60_40_36/840 Demonstrations; Ss_60_40_36/850 Documentation; Ss_60_40_36/860 Servicing and maintenance

System performance

Ss_60_40_36/210 Design of heat pump systems

1. Design: Complete the design of the heat pump system to BS EN 15450.

   Complete the design of the heat pump system in accordance with BSRIA BG 7/2009.
2. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_60_40_36/220 Design parameters

1. Mode: Heating.

2. Ambient temperatures: -2°C outdoor design temperature
   7°C ground reference temperature

Products

See Pr_40_10_57_51 Mechanical plant and equipment identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_78 Self-adhesive colour pipe bands in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_94 Valve identification labels in Ss_55_70_38_15 Cold water supply systems

Pr_70_60_37_04 Air-to-water heat pumps

Shared by: Ss_60_40_92_94 Underfloor low-temperature hot water heating systems and Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: Supply and install new low-temperature monobloc air-to-water heat pump to serve the heating system for the new proposed SEND Block

   The outdoor unit shall be located external to the building in a suitable location which will cause the least disruption possible (away from classroom windows or footpaths, etc). The positions of the heat pump should be approved, where possible, by the client prior to fixing and mounting.

   The outdoor unit shall be positioned with an unobstructed airflow and clearance distance as recommended by the manufacturer. Anti-vibration feet or equivalent shall be used when mounting the unit. The unit must be securely fixed using four M10 bolts into a Flexi Light slab or alternative. When necessary, and once approved by the client, the heat pumps may be mounted on purpose-made wall brackets; in this instance, considerations should be taken with regards to possible vibration nuisance noise in the classroom, etc.

   Provisions must be made for adequate condensate removal from the heat pump. Where possible condensate pipes should be taken to the nearest drain with a continuous fall and should be insulated to help prevent freezing of condensate water. Where a drain is not located in the reasonable vicinity of the heat pump a suitable soak away should be made.
2. Manufacturer: Toshiba (or equal and approved)
   2.1. Product: R32 Riello Monobloc
3. Standards
   3.1. Safety and environmental: To BS EN 378-1 and BS EN 378-2.
   3.2. Test requirements: To BS EN 14511-1, BS EN 14511-2, BS EN 14511-3 and BS EN 14511-4.
   3.3. Electrical safety: To BS EN 60335-2-40.
4. Heat pump type: Monobloc.
5. Mode: Heating.
6. Output
   6.1. Heating: 12.00 kW
7. Fan
   7.1. Type: Axial.
   7.2. Fan drive: Direct.
8. Electrical supply type: Single phase.
9. Controls: A
10. Compressor
    10.1. Type: Twin rotary

10.2. Sealing: Hermetically sealed.

10.3. Drive: Inverter driven.

11. Refrigerant: R32.

See Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation in Ss_55_70_38_15 Cold water supply systems

Execution

See Pr_40_10_57/611 Installing mechanical plant and equipment identification in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/630 Installing valve identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/660 Installing identification on pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/610 Installing insulation and protection products generally in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/640 Installing phenolic foam insulation on pipelines in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/755 Installing at non-loadbearing pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/760 Insulation not carried through pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/780 Installing vapour barriers in Ss_55_70_38_15 Cold water supply systems

Ss_60_40_36/620 Installing heat pump systems

1. Standards: To BS EN 378-2, BS EN 378-3 and BS EN 378-4.
2. Fixing of equipment, components and accessories: Fix securely on purpose-made bases or supports.
3. External units: Away from windows and adjacent buildings. Protect from high winds. Prevent snow, leaves and debris from blocking air flow.
4. Access: Provide for inspection and servicing of heat pumps and ancillary equipment.
5. Refrigerant lines: Short and straight.
6. Condensate: To drain away rapidly, without risk of freezing.

System completion

Ss_60_40_36/810 Commissioning of heat pump systems

1. Pre-commissioning: In accordance with CIBSE Commissioning Code C.
   In accordance with CIBSE Commissioning Code R.
   In accordance with CIBSE Commissioning Code W.
2. Commissioning: In accordance with CIBSE Commissioning Code C.
   In accordance with CIBSE Commissioning Code R.
   In accordance with CIBSE Commissioning Code W.
3. Notice (minimum): 48 h.

Ss_60_40_36/820 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. Recorders
   4.1. Type: Supply and maintain portable seven day space temperature and relative humidity recorders, complete with charts.
   4.2. Number: Three.
5. Reports: Submit on completion.

Ss_60_40_36/830 Inspection and test records

1. Construction phase reports: Post-installation.
   System cleanliness.
   System commissionable.
2. Records for water systems: In accordance with BSRIA BG 2/2010.
3. Records for air systems: In accordance with BSRIA BG 49/2015.
4. Record sheets
   4.1. Submission: On completion.
   4.2. Number of copies: Three.

Ss_60_40_36/840 Demonstrations

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

Ss_60_40_36/850 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: Three.
2. Record drawings
   2.1. Content: Location and arrangement of plant in plant rooms.
   Location, size and route of Mechanical services.
   Location, size, route and depth of underground services.
   Location and identification of pipework regulating, isolation and control valves. Location of outlets.
   2.2. Format: A1 paper print drawing.
   Electronic drawing.
   2.3. Number of copies: Three.
3. Submittal date: At handover.

Ss_60_40_36/860 Servicing and maintenance

1. Requirement: Undertake for 12 months after completion.

Ω End of System

Ss_60_40_37_48
Low-temperature hot water heating systems

Systems

Ss_60_40_37_48 Low-temperature hot water heating systems

1. Description: The Steps building is currently heated via an existing wet perimeter heating system, typically via steel panel radiators.

   The existing radiators shall be stripped out where necessary and indicated on the tender drawings.

   The SEND building will have underfloor heating systems installed in all spaces as detailed on the tender drawings.

   Careful consideration needs to be given to plant dimensions to ensure there is sufficient space for installation, servicing and maintenance, as recommended by the equipment manufacturers and in accordance with Health and Safety Regulations.
2. System performance: Ss_60_40_37/250 System operating parameters for water-based heating systems SEND Block; Ss_60_40_37/280 Chemical treatment for heating systems
3. Arrangement: Two-pipe.
4. Distribution: Constant flow.
   Constant temperature.
   Variable flow.
   Variable temperature.
5. Heat source: Pr_70_60_37_04 Air-to-water heat pumps
6. Fuel: Electricity.
7. Feed and expansion: Pr_65_53_86_68 Pressurisation units
8. Pumps: Pr_65_53_86_11 Canned rotor pumps
9. Pipework: Pr_65_52_63_82 Steel pipes; Pr_65_52_63_83 Steel pipe fittings
10. Fire-stopping: Individual services penetrations fire-stopping system.
11. Valves
    11.1. Pipework Valves & Ancillaries: Allow for all necessary isolation, regulating, control, commissioning, mixing, drain, vents, cocks, etc. as required to enable isolation, regulation, draining, filling, venting of air and control of circuits.

    Isolation valves shall be installed as per the tender drawings. Valves installed horizontally shall be fitted with the valve spindle vertically upwards unless this will result in the valve handle clashing with adjacent services.

    Air release devices shall be installed at all high points within the system and shall comprise automatic air vents. Drain cocks or valves shall be installed at all low points within the system and shall be quarter-turn full bore valves fitted with a blanking plug.

    11.2. Isolating valves: Pr_65_54_95_06 Ball valves

    11.3. Regulating valves: Pr_65_54_95_26 Double regulating valves

    11.4. Radiator valves: Pr_65_54_95_89 Thermostatic radiator valves

    11.5. Draining devices: Pr_65_54_95_27 Draining taps

    11.6. Accessories: Pr_65_54_93_87 Test points
    Pr_65_54_95_75 Safety valves
12. Thermal insulation: Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation

13. Vibration isolation: Supply equipment indicated to ensure that vibration from equipment is not transmitted to building, other supporting structure, pipework or ductwork. Consider the potential for structure-borne noise transmission as well as vibration.

    The Contractor shall be responsible for the selection and performance of all anti-vibration isolation material to satisfy the design requirements.
14. Heat emitters: Pr_70_60_36_73 Radiators - LTHW
    Pr_70_60_36_73 Radiators - Electric
15. Controls: Heating systems control both new for the Send Building and existing.
16. System accessories: Pr_60_50_20_28 Expansion vessels

    Plantroom heating pipework shall be configured in a primary and secondary arrangement, serving a new vertical low-loss header in accordance with Toshiba requirements.
17. Plant and equipment identification: Pr_40_10_57_78 Self-adhesive colour pipe bands; Pr_40_10_57_51 Mechanical plant and equipment identification labels; Pr_40_10_57_93 Valve charts and schematics; Pr_40_10_57_94 Valve identification labels
18. Execution: Ss_60_40_37/620 Installing water-based heating systems; Ss_60_40_37/650 Filling and pressure testing of water-based heating systems
19. System completion: Ss_60_40_37/845 Demonstration of heating systems; Ss_60_40_37/850 Inspection and test records for heating systems; Ss_60_40_37/860 Documentation for heating systems; Ss_60_40_37/870 Operating tools for heating systems; Ss_60_40_37/880 Servicing and maintenance of heating systems

System performance

Ss_60_40_37/250 System operating parameters for water-based heating systems SEND Block

1. Design flow temperature: Maximum 45°C.
2. Temperature difference across primary heating circuit: 10°C - Flow and return temperature difference
3. Water velocity: 15-50mmØ: <1m/s

Ss_60_40_37/280 Chemical treatment for heating systems

1. Treatment: In accordance with BSRIA BG 50/2021 .
2. Chemical treatment
   - 2.1. Corrosion inhibition: Anodic.
     Cathodic.
     Organic film-forming.
   - 2.2. Bacteria and biofouling inhibition: Pseudomonads.
     Treatment for nitrite reducing bacteria.
     Treatment for sulfate reducing bacteria.
3. Non-chemical treatment
   - 3.1. Filtration: Dirt separators.
     Magnetic filtration.
     Strainers.
   - 3.2. Deaeration: Passive deaeration.

Products

See Pr_40_10_57_51 Mechanical plant and equipment identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_78 Self-adhesive colour pipe bands in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_93 Valve charts and schematics in Ss_55_70_38_20 Direct hot water storage supply systems

See Pr_40_10_57_94 Valve identification labels in Ss_55_70_38_15 Cold water supply systems

Pr_60_50_20_28 Expansion vessels

1. Description: Supply and install a new vertical diaphragm expansion vessel suitable for use on heating systems at a working pressure of up to 6 Bar.

   Expansion vessel is to be sized and collaboration with the underfloor heating specialist.
2. Manufacturer: Mikrofil
3. Contact Details:
   3.1. Address:: 11 Merse Rd,
   Moons Moat North Industrial Estate, Redditch,
   B98 9HL
   3.2. Telephone:: +44 (0) 3452 606 020
4. Standard: To BS EN 13831.
5. Duty
   5.1. Size: The Contractor shall check and confirm the water content of the complete heating system and report back to the Contract Administrator prior to ordering or installation of the expansion vessel.

Pr_65_52_63_82 Steel pipes

1. Description:

   Supply and install all pipework as required to complete the installation as detailed in this specification and the tender drawings.

   All pipework shall be mild steel (medium class quality) or stainless steel, unless otherwise specified.
2. Standard: To BS EN 10255, medium weight and BS EN 10216-1.
3. Execution: Pr_65_52_63/680 Installing steel pipework

Pr_65_52_63_83 Steel pipe fittings

1. Description:

   Pipe fittings up to and including 65mm shall be malleable banded iron.

   Pipe fittings 80mm and above are to be cast iron flanged or mild steel welded type fitting with flanges fitted for easy disconnection.

   Where instructed in writing by the Contract Administrator, the use of stainless steel pipe with crimp or mechanical press-fit joints may be permitted. Where press-fit joints are to be used, they shall be WRAS approved and meet the certification BS EN 10312 for use with stainless steel tube.

   Press-fit pipework and fittings shall be as per >B< Press Inox range, as manufactured by Conex Bänninger (or equal and approved).

   All joints shall be marked and signed by the operative prior to pressing. Any unmarked joints will be replaced at the Contractors expense.

2. Standards
   2.1. Malleable: To BS 143 and 1256.
   2.2. Flanged: To BS EN 1092-1.
   2.3. Welded: To BS EN 10253-1 and BS EN 10253-2.
   2.4. Wrought: To BS EN 10241.

Pr_65_53_86/320 Pumps generally

1. General safety standard: To BS EN 809.
2. Electrical safety: To BS EN 60335-1 and BS EN 60335-2-51.
3. Dynamic balance: To BS ISO 21940-21.
4. Test standards: To BS EN ISO 9906 and in accordance with BS EN ISO 5198.
5. Belts and pulleys: To BS 3790.
6. Rotodynamic pumps: To BS EN 16297-1 and BS EN 16644.
7. Connections
   7.1. Flanged, copper alloy and composite: To BS EN 1092-3.
   7.2. Flanged, cast iron: To BS EN 1092-2.
   7.3. Threaded: To BS EN 10226-1.

Pr_65_53_86_11 Canned rotor pumps

1. Description:

   Supply and install new variable speed, twin head inverter driven pumps to serve the SEND LTHW UFH circuits, as detailed on the tender drawings.

   Each pump is to have an engraved label giving its identification number securely attached.

   All pumps are to be separately supported by purpose-made brackets with vibration isolation. Under no circumstances shall the pumps be supported by the pipework.

   Loose pump motor blanking flanges shall be provided and shall be mounted on the wall of the Plant Room adjacent to the pumps.

   All pumps are to be monitored via differential pressure switches installed across the pump, which shall be linked back to the Tosiba central controller.
2. General requirements: Pr_65_53_86/320 Pumps generally
3. Manufacturer: Grundfos (or equal and approved)
4. Contact Details:
   4.1. Address:: Address:
   Grundfos Pumps Ltd
   Grovebury Road
   Leighton Buzzard
   Bedfordshire
   LU7 4TL
   4.2. Email:: grundfos-uk@sales.grundfos.com
   4.3. Web:: https://www.grundfos.com/uk
   4.4. Telephone:: +44 (0)1525 850 000
5. Arrangement: Twin.
6. Duties
   6.1. Operation: Duty/standby.

6.2. Flow rate: Zone 1 - 0.1 kg/s @ XXPa
Zone 2 : 0.04kg/s @ XXPa

6.3. Motor

6.3.1. Nominal voltage: Single phase 230 V a.c.

6.3.2. Frequency: 50 Hz.

7. Speed control: Variable.
8. Connections: Threaded.
Flanged, copper alloy.
9. Accessories: Anti-vibration mountings.
Flexible connections.
Matching flanges.
Positive closure non-return device.
10. Execution: Pr_65_53_86/610 Installation of pumps generally

Pr_65_53_86_68 Pressurisation units

1. Description: The Contractor shall allow to supply and install a new pressurisation management unit within the new SEND block as per the tender drawing.

   The pressurisation set shall be a wall mounted direct mains water pressurisation management unit, and shall provide integral Category 4 backflow protection.

   The pressurisation set shall be connected into the new heating system as detailed. and shall be fully commissioned by the manufacturer in accordance with their recommendations.

   The Contractor shall confirm the final system pressure and safety valve settings to the Contract Administrator.
2. Manufacturer:

   Mikrofill (or equal and approved)
3. Contact Details
   3.1. Address:: Mikrofill Systems Ltd
   West Court
   Merse Road
   North Moons Moat
   Redditch
   B98 9HL
   3.2. Telephone:: +44(0)3452 606 020
   3.3. Email::

   sales@mikrofill.com
   3.4. Web:: https://mikrofill.com/
4. Product:: Mikrofill3
5. Standards
   5.1. General: To BS EN 13831.
   5.2. Domestic heating and hot water supply: In accordance with BS 7074-1.
   5.3. Low and medium temperature hot water heating: In accordance with BS 7074-2.
   5.4. Chilled water and condenser water: In accordance with BS 7074-3.
6. Format: Fully automatic pre-wired packaged unit on common base plate.
7. Arrangement: System connected directly into the incoming mains water supply.
Diaphragm expansion tank with air.
8. Duties

8.1. Static head: 3 bar maximum cold fill pressure

8.2. Plant rating: Standby: 10W
Filling: 30W

8.3. System water content:

To be confirmed by the Contractor

8.4. Motor

8.4.1. Nominal voltage: Single phase 230 V a.c.

8.4.2. Frequency: 50 Hz.

9. Components: Pressure control switch.
Pressure limit switches.

10. Accessories: High pressure switch.
Low pressure switch.
Manual fill unit for initial filling and routine maintenance.

11. Execution: Pr_65_53_86/630 Installing pressurization units

See Pr_65_54_93_87 Test points in Ss_55_70_38_15 Cold water supply systems

See Pr_65_54_95_06 Ball valves in Ss_55_70_38_15 Cold water supply systems

Pr_65_54_95_26 Double regulating valves

1. Description: Supply and install double regulating valves for control on the new system generally as detailed in the tender drawings. The precise location of these valves shall be agreed upon with the Contract Administrator on-site once pipework routes are finalised.

   Flow rate commissioning certificates are to be provided to the Contract Administrator and included within the Operation & Maintenance Manual.

2. Manufacturer: Crane Fluid Systems

3. Contact details

   3.1. Address: Crane House
   Epsilon Terrace
   West Road
   Ipswich
   Suffolk
   IP3 9FJ

   3.2. Telephone: +44 (0)1473 277300

   3.3. Web: www.cranefs.com

   3.4. Email: enquiries@cranefs.com

4. Product reference:

5. Standard: To BS 7350:1990, BS EN 10226-2 (ISO 7-1), BS 2779 (ISO 228) and BS EN 1254/2.

6. Arrangement: Globe.

7. Material: Bronze BS EN 1982 CC491K, DZR Copper Alloy BS EN 12164/5 CW602N, EPDM Rubber and Plastic.

8. Connections: Compression to BS EN 1254-2.

9. Approvals: Water Regulations Advisory Scheme (WRAS).

10. PressureRange: Temperature (Threaded): -10 to +100°C: 25 bar, Temperature (Threaded): +110°C: 23.4 bar, Temperature (Threaded): 120°C: 21.8 bar. Temperature (Compression): -10 to +30°C:16 bar, Temperature (Compression): +65°C: 10 bar, Temperature (Compression): +120°C: 5 bar. WRAS approved -10 to +85°C.

11. Execution: Pr_65_54_95/620 Installation of double regulating valves

See Pr_65_54_95_27 Draining taps in Ss_55_70_38_15 Cold water supply systems

Pr_65_54_95_75 Safety valves

1. Description: Relief valves shall be the spring loaded totally enclosed type, which shall be piped to low level 300mm above the finished floor level of the Plant Room/Store.

   Safety valves shall be set to discharge at the safe working pressure of the system, calculated in accordance with the formula in BS 759-1.
2. Manufacturer: Nabic (or equal and approved)
3. Contact Details:
   3.1. Address:: 46-48 Wilbury Way
   Hitchin
   Hertfordshire
   SG4 0UD
   3.2. Telephone:: 01462 443 278
   3.3. Web:: https://www.nabicvalves.com/
4. Standard: To BS EN ISO 4126-1.
5. Lift type: High.
6. Arrangement: Single.
7. Material: Cast carbon steel.
8. Connections: ≤50mm: Threaded to BS EN 10226-1
9. Accessories: Easing lever.
10. Execution: Pr_65_54_95/660 Installation of discharge connections
    Pr_65_54_95/680 Installation of safety valves

Pr_65_54_95_89 Thermostatic radiator valves

1. Description: All new radiant panels shall be provided with thermostatic radiator valves on the flow connections as detailed on the tender drawings.
2. Manufacturer: Drayton (or equal and approved)
3. Contact details:
   3.1. Address:: Drayton Controls
   401 Southway Drive
   Plymouth
   PL6 6QT
   3.2. Telephone:: +44 (0) 333 600 622
   3.3. Web:: www.draytoncontrols.co.uk
   3.4. Email:: customer.care@draytoncontrols.co.uk
4. Product reference:: Drayton RT
5. Standard: To BS EN 215.
6. Pattern: Straight.
7. Connections: Compression to BS EN 1254-2.
   Threaded to BS EN 10226-1.
8. Execution: Pr_65_54_95/640 Installation of thermostatic radiator valves

Pr_70_60_36_73 Radiators - LTHW

1. Description:

   Generally space heating in the Steps building, shall be provided by new wall mounted panel radiators served by the existing heating installation, as per the tender drawing.

   Radiators shall be supplied with outside tappings and piped in a ‘top bottom opposite ends’

arrangement with thermostatic radiator valves on the flow connection and lock shield valves on the return.

2. Manufacturer: Slelrad
3. Contact details:
   3.1. Address:: Stelrad Limited
   Stelrad House
   Marriott Road
   Mexborough
   Rotherham
   S64 8BN
   3.2. Telephone:: +44 (0)1709 578950
   3.3. Web:: www.stelrad.com
   3.4. Email:: info@stelrad.com
4. Product reference:: Elite K2
5. Standards: To BS EN 442-1 and BS EN 442-2.
6. Radiator type: Double panel double convector.
7. Output: As per the tender drawing
8. Finish:
9. Connections: 15 mm T.B.O.E.
10. Execution: Pr_70_60_36/611 Installing heat emitters generally

Pr_70_60_36_73 Radiators - Electric

1. Description: Space heating in SEND building WC, shall be provided by new wall mounted electric panel radiators, as per the tender drawing.
2. Manufacturer: Dimplex
3. Contact details:
   3.1. Address:: Millbrook House, Grange Drive,
   Hedge End,
   Southampton,
   Hampshire,
   United Kingdom
   SO30 2DF
   3.2. Telephone:: +44 (0) 344 879 3588
   3.3. Web:: www.dimplex.co.uk
4. Product reference:: Low Surface Temperature Panel Heater
5. Standards: To BS EN 442-1 and BS EN 442-2.
6. Radiator type: Electric Panel Heater
7. Output: 500 W
8. Execution: Pr_70_60_36/611 Installing heat emitters generally

See Pr_70_60_37_04 Air-to-water heat pumps in Ss_60_40_36_05 Air source heat pump systems

See Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation in Ss_55_70_38_15 Cold water supply systems

Execution

See Pr_40_10_57/611 Installing mechanical plant and equipment identification in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/620 Installing valve charts and schematics in Ss_55_70_38_20 Direct hot water storage supply systems

See Pr_40_10_57/630 Installing valve identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/660 Installing identification on pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/610 Pipework installation generally in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/615 Installing pipe fittings in Ss_55_70_38_15 Cold water supply systems

Pr_65_52_63/620 Installing anchors generally

1. Purpose: To resist axial stress transmitted by flexure of horizontal and vertical pipe runs, and loading on vertical pipes.
2. Fixings: Provide associated backing plates, nuts, washers and bolts for attachment to, or building into, building structure.
3. Fixing to building structure: Bolted.
4. Building structure: Suitable for transmitted stress.

Pr_65_52_63/625 Installing slide guides

1. Expansion and contraction: Direct movement from pipe anchor points towards loops, bellows, flexible couplings or flexible inserts.
2. Thrust: Linear relative to the axis of pipe.
3. Friction: Apply a friction-reducing material in-between metal faces subjected to movement.

Pr_65_52_63/680 Installing steel pipework

1. General requirements: Pr_65_52_63/620 Installing anchors generally; Pr_65_52_63/625 Installing slide guides; Pr_65_52_63/610 Pipework installation generally; Pr_65_52_63/690 Spacing of pipework; Pr_65_52_63/710 General inspection and testing; Pr_65_52_63/615 Installing pipe fittings
2. Permanently concealed joints: Welded.
3. Accessible joints: Screwed, up to and including 50 mm.
   Press-fit fittings.
   Welded and flanged, 65 mm and over.
4. Expansion loops: Formed bends from single pipe length.
   Jointed welded fittings.
5. Anchor
   - 5.1. Method: Two slip-on flanges welded to pipes, bolted together through a carbon steel channel section.
   - 5.2. Pipe restraints: Carbon steel overstraps or heavy U-bolts welded to pipes.

See Pr_65_52_63/690 Spacing of pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/710 General inspection and testing in Ss_55_70_38_15 Cold water supply systems

Pr_65_53_86/610 Installation of pumps generally

1. Pipeline connections: Arrange to prevent transmission of pipeline forces to pump casing.
2. Pressure gauge tappings: Provide in flow and return pipeline connections and in common suction and delivery pipeline.
3. Brackets: Support pipeline mounted pumps on purpose made brackets lined with vibration absorbent material.
4. Alignment: Align and balance to minimize vibration.

5. Belt tension: Correctly tension drive belts.
6. Access: Provide adequate space for service and maintenance.

Pr_65_53_86/630 Installing pressurization units

1. Standards: Low and medium temperature hot water heating systems in accordance with BS 7074-2.
2. Location of expansion vessel: In the system return pipeline close to the heat source or chilled water unit.

See Pr_65_54_95/610 Installation of valves generally in Ss_55_70_38_15 Cold water supply systems

Pr_65_54_95/620 Installation of double regulating valves

1. General requirements: Pr_65_54_95/610 Installation of valves generally
2. Position: Provide ten diameters of straight pipe upstream of valve and five diameters downstream.

Pr_65_54_95/640 Installation of thermostatic radiator valves

1. General requirements: Pr_65_54_95/610 Installation of valves generally
2. Position: Thermostatic Radiator Valves on the flow connections and Drayton Commercial Lockshield Valves on the return connections.

Pr_65_54_95/660 Installation of discharge connections

1. General requirements: Pr_65_54_95/610 Installation of valves generally
2. Safety and relief valves: Terminate at a safe discharge point.
3. Vent cocks: Terminate 150 mm above floor level.
4. Air bottles: Terminate with air cock or needle valve in accessible position.
5. Automatic air vents: Terminate over a suitable gully or drain line in a visible location.

Pr_65_54_95/680 Installation of safety valves

1. General requirements: Pr_65_54_95/610 Installation of valves generally
2. Inlet connection: As short as possible; diameter no smaller than the outlet bore.
3. Discharge lines : Rise vertically. Fit with small bore drain points to prevent the accumulation of water.

Pr_70_60_36/611 Installing heat emitters generally

1. Fixing:

   Install as per manufacturer's instructions.

See Pr_80_77_76/610 Installing insulation and protection products generally in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/640 Installing phenolic foam insulation on pipelines in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/755 Installing at non-loadbearing pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/760 Insulation not carried through pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/780 Installing vapour barriers in Ss_55_70_38_15 Cold water supply systems

Ss_60_40_37/620 Installing water-based heating systems

1. Standard: To BS EN 14336.

Ss_60_40_37/650 Filling and pressure testing of water-based heating systems

1. Testing: Watertightness test to BS EN 14336, annex A.
   Pressure testing to BS EN 14336, annex B.
   Procedure for filling and pressure testing in accordance with BSRIA BG 29/2021.
2. Notice (minimum): 48 hours.
3. Pressure: 1.5 times working pressure.
4. Inspection and witnessing: In accordance with BSRIA BG 29/2021.
5. Duration of test: Two hours.

System completion

Ss_60_40_37/845 Demonstration of heating systems

1. Running of plant
   1.1. Operation: Run, maintain and supervise the installations under normal working conditions.
   1.2. Duration: Two weeks (minimum); Four weeks; 72 hours' continuous operation.
2. Instruction: Instruct and demonstrate the purpose, function and operation of the installations.

Ss_60_40_37/850 Inspection and test records for heating systems

1. Construction phase reports: Post-installation.
   System cleanliness.
   System commissionable.
2. Records for water systems: In accordance with BSRIA BG 2/2010.
3. Record sheets
   3.1. Submission: On completion.
   3.2. Number of copies: Three.

Ss_60_40_37/860 Documentation for heating 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: Paper.
   Electronic
   1.4. Number of copies: Three.
2. Record drawings
   2.1. Content: Location and arrangement of plant in plant rooms.
   Location, size and route of mechanical services.
   Location and identification of pipework regulating, isolation and control valves.
   Location of outlets.
   2.2. Format: A1 paper print drawing.
   Electronic drawing.
   2.3. Number of copies: Three.
3. Submittal date: At handover.

Ss_60_40_37/870 Operating tools for heating systems

1. Tools: Supply tools for operation, maintenance and cleaning purposes.
2. Keys: Supply keys for valves and vents.

Ss_60_40_37/880 Servicing and maintenance of heating systems

1. Requirement: Undertake for 12 months after completion.

Ω End of System

Ss_60_40_92_94
Underfloor low-temperature hot water heating systems

Systems

Ss_60_40_92_94 Underfloor low-temperature hot water heating systems

1. Description: Supply and install new wet underfloor heating systems to serve the new SEND block.

   All underfloor heating systems shall be supplied by a specialist who shall have a minimum of 10 years' experience of providing these systems in domestic/commercial applications. The system shall be supplied, installed and commissioned in accordance with this specification.

   The underfloor heating system shall be installed within the floor slab in each of the areas, as shown on the drawings and designed to maintain the design set point temperatures indicated on the tender drawings (typically circa 21°C).

   The underfloor heating system shall be suitable for a screeded concrete floor and shall incorporate insulation panels of minimum 50mm deep having a minimum thermal resistance of 1.43 m²/kW, a conductivity of 0.035 W/mK and a design load of 15000 kg/m². The underfloor heating specialist shall liaise with the main Contractor to determine final floor make-up.

   The underfloor heating specialist shall issue a full set of design drawings to the design team for comment prior to installation.
2. System performance: Ss_60_40_92/210 Design of underfloor heating systems; Ss_60_40_92/255 Control strategy for underfloor heating and cooling systems; Ss_60_40_92/260 Chemical treatment for underfloor heating and cooling systems
3. System manufacturer: Nu-Heat (or equal and approved)
4. Heat source: Pr_70_60_37_04 Air-to-water heat pumps
5. Pumps: Integral with manifold.
6. Pipework
   6.1. Distribution: Pr_65_52_63_17 Copper pipes
   6.2. Underfloor: Pr_65_52_63_23 Cross-linked polyethylene (PE-X) pipes and fittings
   6.3. Insulation: Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation
7. Water treatment: Pr_60_55_96_16 Corrosion inhibitor chemicals for closed circuits
8. Accessories: Underfloor heating manifold
9. Controls
   9.1. Controllers: Hardwired controls. Weather compensation. Setback controls
   9.2. Control valves: Underfloor heating manifolds shall be provided complete with appropriate electric thermal actuators for flow control to zones.
   9.3. Sensors: Pr_75_50_76_03 Air temperature sensors
10. Execution: Ss_60_40_92/620 Installing underfloor heating and cooling systems; Ss_60_40_92/640 Pressure-testing of underfloor heating and cooling systems; Ss_60_40_92/650 Flushing underfloor heating and cooling systems
11. System completion: Ss_60_40_92/810 Commissioning underfloor heating and cooling systems; Ss_60_40_92/850 Inspection and test records for underfloor heating and cooling systems; Ss_60_40_92/860 Documentation for underfloor heating and cooling systems; Ss_60_40_92/870 Operating tools for underfloor heating and cooling systems; Ss_60_40_92/880 Servicing and maintenance of underfloor heating and cooling systems; Ss_60_40_92/840 Demonstration of underfloor heating and cooling systems

System performance

Ss_60_40_92/210 Design of underfloor heating systems

1. Design: Complete the design of the water-based underfloor heating systems.
2. Standard: In accordance with BSRIA Guide BG 4/2011.
   To BS EN 1264-1, BS EN 1264-2, BS EN 1264-3 and BS EN 1264-5.
   To BS EN 50559.
   To BS EN ISO 11855-1, BS EN ISO 11855-2 and BS EN ISO 11855-3.
3. Method: In accordance with CIBSE AM 11.
4. Requirement: Submit proposals including detailed design drawings, technical information, calculations and manufacturers' literature.

Ss_60_40_92/255 Control strategy for underfloor heating and cooling systems

1. Strategy: Provide weather compensation control.
2. Controllers: Zone.
3. Temperature sensors: Space.
4. Water temperature controllers: Variable.
5. Valves: Return manifold with control valves.

Ss_60_40_92/260 Chemical treatment for underfloor heating and cooling systems

1. Treatment: In accordance with BSRIA Guide BG 50/2021.

Products

Pr_60_55_96_16 Corrosion inhibitor chemicals for closed circuits

1. Description: Select the appropriate corrosion inhibitors, to minimise corrosion, and biocides to prevent any proliferation of bacteria that may be present in the systems. The inhibitors shall provide protection to mild steel, copper and copper alloys.

   Provide a specific inhibitor to protect aluminium when it is present in system.

   Unless otherwise specified, inhibitor shall be dosed at 1% of system volume. For optimum results, systems should be cleaned and thoroughly flushed prior to dosing.
2. Manufacturer:

   Sentinel (or equal and approved)

See Pr_65_52_63_17 Copper pipes in Ss_55_70_38_15 Cold water supply systems

Pr_65_52_63_23 Cross-linked polyethylene (PE-X) pipes and fittings

1. Description: The underfloor heating pipework shall be a multi-layer polyethylene or polybutylene pipe, continuously laid, complete with 100% efficient oxygen diffusion barrier. Pipework is to be provided with a 40 year guarantee, and shall be fully compliant with the relevant ISO and DIN Standards.

   The pipe shall be laid fully in accordance with the underfloor heating specialist's recommendations in terms of fixings, insulation, spacing, pipe bending radii, and acceptable floor coverings.

   The underfloor heating specialist shall provide full and comprehensive details of the associated builders work that will be required for the satisfactory installation of the heating pipe. The

underfloor heating system shall be installed by the specialist.

Before the pipework is covered, a Certificate of Conformity shall be issued by the specialist to confirm that the system has been satisfactorily installed and pressure tested.

2. Standards
   2.1. Pipe: To BS EN ISO 15875-2, Class 4.
   2.2. Fittings: To BS 7291-3, Class S.
   To BS EN ISO 15875-3, Class 4.

See Pr_70_60_37_04 Air-to-water heat pumps in Ss_60_40_36_05 Air source heat pump systems

Pr_75_50_76_03 Air temperature sensors

1. Description: Each underfloor heating zone shall incorporate a room sensor for temperature control of the space.

   This shall be via electric actuators and valves on the manifold for the wet system that will be required to link back to the Toshiba user interface, as per the tender drawings,
2. Standards: To BS EN 60730-1 and BS EN IEC 60730-2-9.
3. Application: Room.
4. Range: -10°C to 40°C.
5. Accuracy: ±0.5°C
6. Equipment interconnectivity
   6.1. Wired: Wiring required.
7. Execution: Pr_75_50_76/675 Installing temperature sensors

See Pr_80_77_76_62 Phenolic foam insulation Pipework Insulation in Ss_55_70_38_15 Cold water supply systems

Execution

See Pr_65_52_63/610 Pipework installation generally in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/615 Installing pipe fittings in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/630 Installing copper pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/635 Brazed joints in copper and copper alloy pipes in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/690 Spacing of pipework in Ss_55_70_38_15 Cold water supply systems

See Pr_65_52_63/710 General inspection and testing in Ss_55_70_38_15 Cold water supply systems

Pr_75_50_76/651 Installing sensors generally

Shared by: Pr_75_50_76_02 Air quality sensors

1. Standard: In accordance with BCIA Guide: Controls for End Users and BSRIA AG 9
2. Screening: Screen from direct sunlight.
3. Immersion: Immerse the sensor adequately in the medium.
4. Immersion pockets: Provide for pipe sensors. Fill with thermal conductive compound.
5. Cable: Flexible. Allow sufficient spare cable to allow for removal of sensor.
6. Stratification: Install more than one sensor or an averaging sensor if necessary.

Pr_75_50_76/675 Installing temperature sensors

1. General requirements: Pr_75_50_76/651 Installing sensors generally
2. Room sensors
   2.1. Height: 1.5 m above floor.
   2.2. Position: Away from corners and doors. Away from heat sources and draughts. Away from direct solar radiation. Not on external walls. In the area controlled.
3. Outside air sensors: Do not locate next to extract points, above windows or under eaves.
4. Interconnection: To valve actuator.

See Pr_80_77_76/610 Installing insulation and protection products generally in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/640 Installing phenolic foam insulation on pipelines in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/755 Installing at non-loadbearing pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/760 Insulation not carried through pipelines supports in Ss_55_70_38_15 Cold water supply systems

See Pr_80_77_76/780 Installing vapour barriers in Ss_55_70_38_15 Cold water supply systems

Ss_60_40_92/620 Installing underfloor heating and cooling systems

1. Standard: To BS EN 1264-4.
2. Fixing of manifold: Locate with access for regulation and maintenance and away from areas sensitive to noise.
3. Fixing of pipes
   3.1. Solid floors: Maintain 6 bar hydraulic pressure in underfloor pipework during the installation of screed, and maintain pressure until screed is cured in accordance with screed supplier's recommendations.
   3.2. Raised access floors: Mount pipes with spreader plates between pedestals and floor tiles.

Ss_60_40_92/640 Pressure-testing of underfloor heating and cooling systems

1. Testing: To BS EN 1264-4.
   In accordance with BESA Technical Report TR/6.
2. Notice (minimum): Three working days.
3. Pressure: 1.5 times working pressure.
4. Duration of test: One hour.

Ss_60_40_92/650 Flushing underfloor heating and cooling systems

1. Preliminary checks: Thoroughly inspect pipework and complete pressure tests before flushing and cleaning.
2. Flushing: In accordance with BSRIA Guide BG 29/2021.
3. Waste products : Neutralize, and dispose of to drain; preferably direct to manhole.

System completion

Ss_60_40_92/810 Commissioning underfloor heating and cooling systems

1. Pre-commissioning: In accordance with BSRIA Guide BG 2/2010 and CIBSE Commissioning Code: Water distribution systems.

2. Commissioning: In accordance with BSRIA Guide BG 2/2010 and CIBSE Commissioning Code: Water distribution systems.
3. Variable flow systems: In accordance with CIBSE KS09 Commissioning variable flow pipework systems.
4. Notice (minimum): Three working Days

Ss_60_40_92/840 Demonstration of underfloor heating and cooling systems

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

   Two weeks' continuous operation.
2. Instruction: Instruct and demonstrate the purpose, function and operation of the installations.

Ss_60_40_92/850 Inspection and test records for underfloor heating and cooling systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Construction phase reports: System cleanliness.
   System is commissionable.
   Post-installation.
2. Records for water systems: In accordance with BSRIA Guide BG 2/2010.
3. Record sheets
   3.1. Submission:

   On completion.
   3.2. Number of copies: Three

Ss_60_40_92/860 Documentation for underfloor heating and cooling 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.
   Paper copy.
   1.4. Number of copies: Three
2. Record drawings
   2.1. Content: Location and arrangement of plant in plant rooms.
   Location, size and route of mechanical services.
   Location and identification of pipework regulating, isolation and control valves.
   Location of outlets.
   All drawings to be 'as-built' status.
   2.2. Format: Electronic. A1 paper print.
   2.3. Number of copies: Three

Ss_60_40_92/870 Operating tools for underfloor heating and cooling systems

1. Tools: Supply tools for operation, maintenance and cleaning purposes.

   Supply keys for valves and vents.

Ss_60_40_92/880 Servicing and maintenance of underfloor heating and cooling systems

1. Requirement: Undertake for 12 months after completion.

Ω End of System

Ss_65_40_33_51
Mechanical ventilation systems

Systems

Ss_65_40_33_51 Mechanical ventilation systems

1. Description: Supply and install new mechanical ventilation with heat recovery (MVHR) systems to serve WC within the new SEND block (as detailed on the tender drawings).

   All fans provided as part of the mechanical ventilation installation shall be selected to comply with the specific fan power requirements as detailed in Non-Domestic Building Services Compliance Guide.

   All ductwork shall be clean when erected and shall be continuously protected during installation against the ingress of dirt, debris and vermin.

   All ductwork and air handling plant shall be leakage tested to a standard appropriate to its operating pressures. In the event of the test showing leakage, the Contractor shall be responsible for sealing and re-testing until a satisfactory result is obtained.

   These systems are to be commissioned to provide the fresh air volume to satisfy the requirements of this document.
2. Type of system: Mechanical supply and extract ventilation with heat recovery.
3. External air intake: Pr_30_59_48_04 Aluminium louvre panel units
4. Air-handling units: Pr_60_65_03_87 Supply and return air-handling units
5. Air ductwork and accessories
   5.1. Ductwork: Pr_65_65_25_14 Circular sheet metal ductwork and fittings
   5.2. Accessories: Pr_65_65_23_20 Duct access panels; Pr_65_65_24_29 Fire and smoke dampers
6. Thermal insulation on supply air ductwork: Pr_80_77_76_62 Phenolic foam insulation Ductwork
7. Vibration isolation mountings: Include all measures available to isolate the transmission of noise and vibration from mechanical plant to the structure. All items of mechanical equipment including, but not limited to pumps, fans, condensers and air handling units shall have manufacturer supplied anti-vibration mounts.

   The Contractor shall be responsible for the selection and performance of all anti-vibration isolation material to satisfy the design requirements
8. Room supply air terminal devices: Pr_70_65_04_02 Air diffusers
9. Room extract air terminal devices:: Pr_70_65_04_03 Air grilles
10. Controls: These systems shall operate in trickle mode and boost via presence detectors via the light circuit and timer overrun. The supply shall be commissioned to 90% of the extract duty to negatively pressurise the toilet area.

    The tender drawings indicate air volumes designed to provide a minimum of 7.5 l/s per m2 in the WCs as per BB101.
11. Identification of ductwork and equipment: Pr_40_10_57_79 Self-adhesive plastics ductwork labels and transfers; Pr_40_10_57_51 Mechanical plant and equipment identification labels
12. Execution: Ss_65_40_33/630 Installing ductwork to fans and air-handling units
13. System completion: Ss_65_40_33/810 Commissioning of air distribution systems; Ss_65_40_33/830 Inspection and test records for ventilation systems; Ss_65_40_33/840 Training for ventilation systems operation; Ss_65_40_33/850 Record documentation for ventilation systems; Ss_65_40_33/860 Spares and consumables for ventilation systems; Ss_65_40_33/870 Maintenance of ventilation systems

Products

Pr_30_59_48_04 Aluminium louvre panel units

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Description: The Contractor shall include for the supply and installation of all exhaust and fresh air intake louvres required for the ventilation systems.
2. Manufacturer: Gilberts (Blackpool)
3. Product reference::

   Series WG
4. Size (l x w x d): Refer to tender drawings and schedules.
5. Material: Extruded aluminium alloy frame and louvre blades, to BS EN 755-1.
6. Finish: Milled.
   Powder coating to BS EN 12206-1.
   To be confirmed by the architect.
7. Colour: To be confirmed by the architect.
8. Construction: Flanged frame.
9. Air intake and exhaust performance
   9.1. Application:

   Exhaust.
   Intake.
   9.2. Air volume: Refer to tender drawings
   9.3. Face velocity: Maximum face velocity of 2.5m/s.
10. Louvre configuration
    10.1. Number of banks: One.
    10.2. Blade orientation: Horizontal.
    10.3. Blade pitch: 38mm
    10.4. Blade angle: Fixed.
11. Accessories: Expanded aluminium alloy 12 mm mesh bird guard.
    Perforated expanded aluminium alloy 3.5 mm mesh insect guard.

See Pr_40_10_57_51 Mechanical plant and equipment identification labels in Ss_55_70_38_15 Cold water supply systems

Pr_40_10_57_79 Self-adhesive plastics ductwork labels and transfers

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Description: Each range of ductwork shall be identified in accordance with BESA DW/144 and indicate the direction of airflow, area served, zone served and plant number.

   Apply primary and secondary identification to each duct, at least:
   - Once in every room or enclosed area
   - At intervals not exceeding fifteen metres
   - At every junction
   - At every damper
   - At every inspection and access position into service shafts, false ceilings, bulkheads etc.

   Primary identification shall consist of coloured bands, 300mm wide.

   Secondary identification consist of the following:

- For ducts with longest side or diameter up to and including 225mm, paint coloured bands 50mm wide and superimpose legends
- For ducts with longest side or diameter over 225mm, paint or apply transfers to identification triangles, or triangular plates and superimpose or incorporate legends.

2. Standard: To BS 1710.
   To BS EN 16798-3.
3. Identification label: Adhesive labels applied to the duct or insulation as appropriate.
4. Lettering: Black letters
5. Shape and size: Equilateral triangle with 150 mm-length side.
6. Execution: Pr_40_10_57/650 Installing ductwork identification

Pr_60_65_03_87 Supply and return air-handling units

1. Description:

   MVHR units shall comprise of supply a and extract fan, complete with counter flow plate heat exchangers for heat recovery, generally mounted within the ceiling voids.

   The contractor shall supply and install all necessary accompanying ductwork, grilles, condensate pipework and electrical connections, as indicated on the Tender drawings.
2. Manufacturer: Nuaire (or equal and approved)
3. Contact details:
   3.1. Address::

   Western Industrial Estate
   Caerphilly
   CF83 1NA

   3.2. Telephone:: +44 (0) 29 2085 8200
   3.3. Web:: https://www.nuaire.co.uk
   3.4. Email:: enquiries@nuaire.co.uk
4. Product reference:: UNI-X220-C
5. Standard: To BS EN 13053.
6. Duty
   6.1. Air volume
      6.1.1. Supply: 27 l/s @30 Pa
      6.1.2. Extract: 30 l/s @30 Pa
7. Environment: Internal.
8. Casing construction
   8.1. Standard: To BS EN 1886.
   8.2. Acoustic insulation of casing: To BS EN 1886, section 9.
   8.3. Fire protection:
   8.4. Mechanical safety: To BS EN 1886, section 11.
   8.5. Material: Galvanized sheet steel.
   8.6. Finish: Manufacturer's standard.
9. Components
   9.1. Filters: Units provided with G3 (ePM10 75%) panel filters (supply and extract).
   9.2. Heat recovery

9.2.1. Heat recovery equipment: A counterflow plate heat exchanger is also used to recover up to 85% of the extracted air heat. The HX bypass damper shall open automatically via a wax actuator allowing the air to bypass the heat exchanger to deliver fresh filtered air during the warmer months.

9.3. Supply fan

9.3.1. Fan type:

IP54 EC motorised fan

9.4. Extract fan

9.4.1. Fan type:

IP54 EC motorised fan

10. Accessories:

Access panels.
Anti-vibration mountings.
Flexible connectors.

11. Execution: Pr_60_65_03/610 Installing air-handling units; Pr_60_65_03/615 Access; Pr_60_65_03/620 Coil installation generally; Pr_60_65_03/650 Services connections; Pr_60_65_03/655 Isolation of air-handling units; Pr_60_65_03/680 Air leakage testing; Pr_60_65_03/685 Testing

Pr_65_65_23_20 Duct access panels

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Description: All internal ductwork surfaces shall be accessible for cleaning and inspection, with access doors installed at minimum 3m centres.
    - Access doors shall be provided in the following locations, to give access to:
    - Every regulating damper
    - Every fire-and-smoke, and motorised damper
    - Filters (to facilitate filter withdrawal)
    - Both sides of trimmer cooling/heating coils
    - Zone humidifiers
    - Auxiliary fans
    - Ducts, where required for cleaning

    The access panels shall be of at least the same thickness and material as the ductwork, be grease tight using heat-proof gasket and contain minimum projections into the duct.

    Access doors shall generally be installed on the side of the duct, with the underside of the door at least 40mm above the underside of the duct. Where duct runs are insulated the insulation and finish shall be adapted to allow sections to be to access hatches.

2. Material: Galvanized sheet steel.
3. Safety
    3.1. Trim: For fully removable access doors, rubber trim can be applied to the interior edges of the ductwork cut-out to cover sharp edges.
    3.2. Screws: No self-tapping or piercing screws within one metre of an access opening in accordance with BS EN 12097

Pr_65_65_24_29 Fire and smoke dampers

1. Description:

Allow to supply and install all required fire & smoke dampers to all ductwork penetrations through

fire rated walls, in accordance with the architectural fire strategy drawings.

Fire dampers are to be provided with mechanical actuators to provide a minimum of two hours fire protection, or to match fire resistance of building fabric being penetrated and come complete with access panel to allow resetting of the damper(s).

Penetrations through fire compartmentation lines shall be made good by the Main Contractor and finished with intumescent sealant.

2. Manufacturer: Swegon
3. Contact details
   3.1. Address: Swegon Air Management Ltd,
   Joseph Wilson Industrial Estate,
   South Street ,
   Whitstable,
   CT5 3DU Kent
   3.2. Telephone: +44 (0) 1634 981750
   3.3. Web: www.swegon.com/uk/
4. Product reference: Thermshield FDC - FD25
5. Standard
   5.1. Fire dampers: To EN 15650:2010.
   5.2. Test: To EN 1366-2.
   5.3. Classification: To EN 13501-3.
6. Arrangement: Single-blade.
7. Classification: Fire and Smoke Dampers: EIS Classified (EI120S)
8. Material: Galvanized steel.
9. Accessories: Electrical cut-out switches.
   External visual indication of fire damper blade position.
   Microswitches for status indication.
10. Dimensions: 150 mm diameter,
11. Air tightness: Class C.
12. Integral accessories: Tunnel casing extension.
13. Third-party certification: CE marked BCCA-0749-CPR-BC1-606-0464-15650.02-2517.
    UKCA marked 2822-UKCA-CPR-0055.
    NF537 marked 18.16.
    VKF/ AEAI certificate 26815.
    Hy hygiene certificate W-336769-20-Zd.
    RISE certificate SC0648-15.
14. Execution: Pr_65_65_24/725 Installing fire and smoke control dampers; Pr_65_65_24/750 Access to dampers for resetting and maintenance

Pr_65_65_25_14 Circular sheet metal ductwork and fittings

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Description: Unless otherwise stated, all ductwork shall be galvanised mild steel, with a minimum thickness of 0.8mm.
2. Standards: To BESA DW/144, BS EN 1506 and BS EN 12237.
3. Classification: Class A.
4. Material: Carbon steel to BS EN 10130, Grade FEP 01A.
5. Access openings

5.1. Purpose: Inspection.
Cleaning.
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_25/740 Installing control equipment and instruments in metal ductwork; Pr_65_65_25/670 Ductwork support for vapour seal continuity; Pr_65_65_25/690 Drainage of ductwork; Pr_65_65_25/700 Test holes in ductwork; Pr_65_65_25/795 Air leakage testing of low-pressure ductwork; Pr_65_65_25/790 Air leakage testing of plant items

Pr_70_65_04_02 Air diffusers

1. Description: Supply and install the SEND WC diffusers as detailed on the tender drawings.

   All grilles shall be supplied with duct-mounted opposed blade dampers to enable accurate commissioning to the flow rates detailed on the tender drawings.
2. Manufacturer:

   Gilberts (Blackpool), or equal and approved
3. Product reference:: Series SX
4. Standards
   4.1. Mixed flow applications: To BS EN 12238.
   4.2. Sound power levels: To BS EN ISO 5135.
5. Application: Supply.
6. Duty
   6.1. Air volume: See tender drawings
   6.2. Size: See tender drawings
7. Core velocity (maximum): <4 m/s.
8. Diffuser: Multi-core.
9. Shape: Circular.
10. Arrangement: Non-adjustable.
11. Position: Ceiling.
12. Material: Aluminium.
13. Finish: Powder coated to a RAL colour as per architect's requirements.
14. Accessories: Pr_70_65_04/680 Location of grille or diffuser blanking plates
15. Execution: Pr_70_65_04/620 Installing circular and rectangular diffusers
    Pr_70_65_04/690 Support of air terminal units in ceiling grids

Pr_70_65_04_03 Air grilles

1. Description: Supply and install the SEND WC grille as detailed on the tender drawings.

   All grilles shall be supplied with duct-mounted opposed blade dampers to enable accurate commissioning to the flow rates detailed on the tender drawings.
2. Manufacturer: Gilberts (Blackpool), or equal and approved
3. Product reference::

   Series GX
4. Standards
   4.1. Mixed flow applications: To BS EN 12238.
   4.2. Displacement flow applications: To BS EN 12239.

4.3. Sound power levels: To BS EN ISO 5135.

5. Application: Extract.
6. Duty
   6.1. Air volume: See tender drawings
   6.2. Size: See tender drawings
7. Core velocity (maximum): <4 m/s.
8. Shape: Square.
9. Grille type: Eggcrate.
10. Position: Ceiling.
11. Material: Aluminium.
12. Finish: Mill finished, or powder coated to a RAL colour as per architect's requirements.
13. Accessories: Pr_70_65_04/680 Location of grille or diffuser blanking plates Type A
14. Execution: Pr_70_65_04/650 Installing grilles
    Pr_70_65_04/690 Support of air terminal units in ceiling grids Type A

Pr_80_77_76_62 Phenolic foam insulation Ductwork

1. Description: All new building services shall be fully insulated following the successful installation, testing, commissioning and witnessing of the installation by the Contract Administrator.

   Unless otherwise specified, the following ductwork shall be thermally insulated:

   - All fresh air intake ductwork connections between the external air terminal and the air handling plant

2. Manufacturer: Kingspan Insulation
3. Contact details
   3.1. Address: Kingspan Insulation Ltd
   Pembridge
   Leominster
   Herefordshire
   United Kingdom
   HR6 9LA
   3.2. Telephone: +44 (0)1544 388601
   3.3. Web: https://www.kingspan.com/gb/en-gb
   3.4. Email: info@kingspaninsulation.co.uk
4. Product reference: Kooltherm Duct Insulation
5. Standard: To BS EN 14314:2009+A1:2013.
6. Form: Duct slab.
7. Thermal conductivity: 0.022 W/m K at 10°C.
   0.023 W/m K at 25°C.
8. Finish: Exposed aluminium foil facing.
9. Fire performance: To BS EN 13501-1, class B-s2, d0 (exposed foil face); class E (non exposed tissue face).
10. Insulation thickness (minimum): To meet maximum permissible heat loss (for warm air ducts) and heat gain (chilled/dual-purpose air ducts) in accordance with BS 5422, and Approved Document Part L Volume 2.
11. Vapour barrier
    11.1. Material: Factory-applied aluminium foil.
12. Protection: For external application the insulation must be covered with a waterproof finish comprising 0.7mm thick Aluzink sheet or a proprietary laminated foil/film introduced during the fabrication of the ductwork.

13. Accessories: Bands (preferably aluminium).
    Aluminium tape.
14. FM approved: FM Approved per Approval Standard 4924 as a low fire hazard.
15. Compressive strength (minimum): 100 kPa at 10% compression.
16. Closed cell content: ≥90%.
17. Nominal density range: 30–35 kg/m³.
18. Execution: Pr_80_77_76/645 Installing phenolic foam insulation on ductwork; Pr_80_77_76/610 Installing insulation and protection products generally

Execution

See Pr_40_10_57/611 Installing mechanical plant and equipment identification in Ss_55_70_38_15 Cold water supply systems

Pr_40_10_57/650 Installing ductwork identification

1. Standard: In accordance with BS 1710.
2. Method: Securely fix labels.
3. Position: Locate where visible.
4. Direction of flow: One apex of the triangle pointing in the direction of flow.
5. Information: Location or designation of plant which treats the air.
   Air being conveyed, direction of flow, destination of the air.
   Space served by the duct and associated plant.

Pr_60_65_03/610 Installing air-handling units

1. Standard: In accordance with BS EN 13053.
2. Component assembly
   2.1. Sealing: Provide gaskets between air-handling unit sections to prevent air leakage from casing.
   2.2. Site-drilling :

Pr_60_65_03/615 Access

1. Access space: Position air-handling units to allow space for maintenance and access.

Pr_60_65_03/620 Coil installation generally

1. Venting and draining: Set out pipelines to and from the coils to allow venting and draining of the coils and piping.
2. Support: Do not support pipelines and valves on coil connections.
3. Access: Allow space to inspect and maintain the coils on both sides.

Pr_60_65_03/650 Services connections

1. Entry points: Seal around electrical cable and pipeline entry points to prevent air leakage.
2. Flexible cables: Provide between fan motor and local isolator.

Pr_60_65_03/655 Isolation of air-handling units

1. Electrical connections: Provide means of isolating air-handling units electrically.
2. Pipe connections: Provide means of isolating pipelines to air-handling units.
3. Steam: Provide means of isolating steam to humidifier when access door is opened.

Pr_60_65_03/680 Air leakage testing

1. Testing: In accordance with BS EN 1886.

Pr_60_65_03/685 Testing

1. Test location: On site before incorporation in works.
2. Tests: Component air pressure drops. Fan and motor speeds.
   Fan flow rate and developed pressure, using simulated system resistance.
   Functional test on electrical equipment. Motor starting and running currents.
   Power consumption.
   Sound power level.
   Vibration measurements.
3. Test results: Submit on completion.

Pr_65_65_24/725 Installing fire and smoke control dampers

1. Standard: In accordance with ASFP Volume 1: EN fire dampers. (Grey book).
   In accordance with BESA DW/145.
   Installation record information to BS EN 12101-8.
   Install fire dampers in accordance with Good Building Guide 81.
2. Break-away joints: Break-away joints required at all fire dampers.
3. Fixings: Self-tapping screws not permitted for fixing fire dampers.

Pr_65_65_24/750 Access to dampers for resetting and maintenance

1. Position: Provide access to damper mechanisms on fire dampers; smoke dampers; combined smoke and fire dampers, and volume control dampers through access doors, suspended ceilings, etc. Where more than one fire damper is installed in a frame provide access to all fire dampers.
2. Fire links: Provide access for replacement.

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 BESA 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: Fit on fan inlets and outlets.
   Fit at building expansion joints.
   Install fully stretched to minimize pressure drop.
   Keep flexible duct lengths to a maximum of 250 mm.

Pr_65_65_25/670 Ductwork support for vapour seal continuity

1. Method of support:

   Ensure that vapour seal is maintained throughout.

Pr_65_65_25/690 Drainage of ductwork

1. Ductwork: Install to drain entrained moisture.
2. Joints: Lap to minimize moisture leakage.

Pr_65_65_25/700 Test holes in ductwork

1. Position: In accordance with CIBSE Commissioning Code Series A and BESA DW/144.

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.
3. Access doors: Located upstream of sensor in accordance with BESA DW/144.

Pr_65_65_25/790 Air leakage testing of plant items

1. Standard: To BESA 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: Paper copy.
     Electronic.
   - 3.2. Submit: On completion.
   - 3.3. Number of copies: Three

Pr_65_65_25/795 Air leakage testing of low-pressure ductwork

1. Standard: To BESA DW/144 and DW/143.
2. Extent: Random testing of 10% maximum of the ductwork system.
   Carry out tests as work proceeds before thermal insulation is installed.
   Where a test fails, select two further sections for testing.
   Carry out remedial work where tests fail.
3. Test pressure: To BESA DW/144, Table 22.
4. Documentation: Air leakage test sheet.
5. Report
   - 5.1. Format: Electronic.
     Paper copy.
   - 5.2. Submit: On completion.
   - 5.3. Number of copies: Three

Pr_70_65_04/610 Installing air terminal devices

1. General: Do not distort air terminal devices. Fix securely.
2. Air leakage: Prevent. Seal joints with self adhesive foam strip or equivalent.
3. Appearance: Finish visible edge joints neatly. Do not leave sharp edges and protruding screws.
4. Operation: Fit so that moving parts operate correctly and removable cores can be taken out and replaced.
5. High level and ceiling applications: On removable cores, provide safety wires with quick release ends.

Pr_70_65_04/620 Installing circular and rectangular diffusers

1. General requirements: Pr_70_65_04/610 Installing air terminal devices
2. Method: Flange screw.
   Hidden screw.
   Rear support angles.
   Rear suspension bracket.
   Spring edge clip.
   Suspension bolts and brackets.

Pr_70_65_04/650 Installing grilles

1. General requirements: Pr_70_65_04/610 Installing air terminal devices
2. Method:

Visible, flange screw fixing.
Visible, with quick release fastener.

Pr_70_65_04/680 Location of grille or diffuser blanking plates

1. Position: Where needed to restrict projection of air flow from section of grille or diffuser.

Pr_70_65_04/680 Location of grille or diffuser blanking plates Type A

1. Position: Where needed to restrict projection of air flow from section of grille or diffuser.

Pr_70_65_04/690 Support of air terminal units in ceiling grids

1. Standard: To BESA DW/144.
2. Independent support: Independent support.
3. Position: Agree final position of air terminals before installation.

Pr_70_65_04/690 Support of air terminal units in ceiling grids Type A

1. Standard: To BESA DW/144.
2. Independent support: Independent support.
3. Position: Agree final position of air terminals before installation.

See Pr_80_77_76/610 Installing insulation and protection products generally in Ss_55_70_38_15 Cold water supply systems

Pr_80_77_76/645 Installing phenolic foam insulation on ductwork

1. Ducts
   1.1. Circular: Apply circular duct insulation.
2. Joints: In accordance with BS 5970.
3. Duct supports: Use phenolic foam crocodile strips on circular ducts.

Ss_65_40_33/630 Installing ductwork to fans and air-handling units

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Air discharge: Connect ductwork to allow air to straighten as it leaves the fan or air-handling unit.
   Install flexible connections as straight as possible when connecting to fans.
   Check fan direction arrows when installing.
   Ensure that any backdraft shutters are freely operable prior to making connections.
   Ensure that all packaging and any debris is removed from inside the unit during installation.

System completion

Ss_65_40_33/810 Commissioning of air distribution systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Pre-commissioning: In accordance with BSRIA BG 49/2015 and CIBSE Commissioning code A.
2. Commissioning: In accordance with BSRIA BG 49/2015 and CIBSE Commissioning code A.
3. Notice (minimum): 48 hours.

Ss_65_40_33/830 Inspection and test records for ventilation systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Construction phase reports: Post-installation.
   System cleanliness.
   System commissionable.
2. Records for air systems: In accordance with BSRIA BG 49/2015.
3. Record sheets
   3.1. Submission: On completion.
   3.2. Number of copies: Three.

Ss_65_40_33/840 Training for ventilation systems operation

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Running of plant
   1.1. Operation: Run, maintain and supervise the installations under normal working conditions.
   1.2. Duration: One week.
2. Instruction
   2.1. Training: Instruct and demonstrate the purpose, function and operation of the installations.
   Identify safety features and system resets.
   Familiarisation with the major plant and equipment.
   Advice on future maintenance of the systems.
   2.2. Notice period (minimum): Six weeks.
   2.3. Record: Signed record of training sheets

Ss_65_40_33/850 Record documentation for ventilation systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Operating and maintenance instructions
   1.1. Scope: Submit for the system as a whole giving optimum settings for controls.
   1.2. Product information: Product description.
   Date of purchase.
   Performance characteristics.
   Application (suitability for use).
   Method of operation and control.
   Cleaning and maintenance requirements.
   1.3. Format: Paper copy.
   Electronic.
   1.4. Number of copies: Three.
2. Record drawings
   2.1. Content: Location and arrangement of plant in plant rooms.
   Location, size and route of ductwork.
   Location and identification of regulating dampers and fire dampers.
   Location of outlets.
   Schematics.
   2.2. Format: A1 paper print.
   Electronic.
   2.3. Number of copies: Three.
3. Submittal date: At handover.

Ss_65_40_33/860 Spares and consumables for ventilation systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Filters
   1.1. Filter media: Supply one replacement for every type of filter.
   1.2. Retaining clips and rubber gaskets:

   Two sets for each type of filter
   1.3. Cleaning solution: Supply coating solution for one complete cleaning of metal plate filters.
2. Detectors:

   Supply two of each type.
3. Keys: Plant electrical panel keys.
   Ventilation plant access keys
4. Air terminal device keys: Supply a set for adjusting each size and type of grille and diffuser.
   Supply a set for adjusting each type of grille and diffuser damper.
5. Paint: Touch-up paint in manufacturer's RAL number.

Ss_65_40_33/870 Maintenance of ventilation systems

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Servicing and maintenance: Undertake for 12 months after practical completion.

Ω End of System

Ss_65_40_33_56
Natural ventilation systems

Systems

Ss_65_40_33_56 Natural ventilation systems

1. Description: All occupied spaces where indicated on the Tender drawings shall employ natural ventilation. This shall utilise the following:
    - Manual openable low-level windows
    - Actuated windows, with Teleflex control
    - Electrically operated actuators
    - Natural crossflow ventilation

   Ensure window and vent operating mechanisms are 'virtually' silent to avoid distraction; these shall not give rise to more than a 3dB increase in the Indoor Ambient Noise Level specified for the space.

   The contractor must verify that all actuators in the Steps building are operational and replace any that are not.

   Windows will offer graduated control, allowing them to be opened as much as required to control CO2 and temperature without causing draught problems.

   The contractor must allow for the repositioning of the existing actuator controls within the steps building to the position shown on the tender drawing.

   Prior to installation, the Control specialist shall forward their equipment selection and technical drawings for comment and approval.
2. Ventilation openings: Windows.
   Pr_30_59_94_06 Air transfer grilles
3. Accessories: Pr_75_50_76_02 Air quality sensors
4. Controls: Local standalone control.
   Manual opening.
5. Ventilation opening control: Sensor-controlled.
   On/ off.
6. Execution: Ss_65_40_33/620 Installing natural ventilation systems

Products

Pr_30_59_94_06 Air transfer grilles

Shared by: Ss_65_40_33_90 Toilet extract ventilation systems

1. Description:

   Allow to provide air transfer ducts/door transfer grilles/door undercuts as required to provide make-up air
2. Manufacturer: Gilberts (Blackpool), or equal and approved
3. Product Reference:: Series NV
4. Standard: To BS EN 13141-1 .
5. Configuration: See tender drawings
6. Size: See tender drawings
7. Colour: To be confirmed by the architect.

Pr_75_50_76_02 Air quality sensors

1. Description:

   All occupied spaces employing natural ventilation shall be supplied with a wall-mounted carbon dioxide 'traffic light' system; this system will give a visual indication of the carbon dioxide concentration within the space, using green and amber to indicate the CO2 levels.

   Under normal conditions, it is expected that the occupants would open and close the windows to control the carbon dioxide, humidity and temperature within the space via manual openable windows.
2. Manufacturer: Flamefast
3. Contact details:
   3.1. Address:: 10 Ravenhurst Court
   Birchwood, Warrington
   WA3 6PN
   3.2. Telephone:: +44 (0) 1925 281249
   3.3. Web:: www.flamefast-gas-safety.co.uk
   3.4. Email:: gassafety@flamefast.co.uk
4. Product reference:: CO2, TEMP & RH MONITOR (CO2M)
5. Sensor type: CO2 / temperature/ relative humidity sensor.
6. Equipment interconnectivity
   6.1. Wired: Required.
7. Mounting: Room (Wall Mounted)
8. Display:: Configurable colour LCD with CO2 [ppm], temperature [°C] and humidity [%RH].
9. Execution: Pr_75_50_76/656 Installing air quality sensors

Execution

See Pr_75_50_76/651 Installing sensors generally in Ss_60_40_92_94 Underfloor low-temperature hot water heating systems

Pr_75_50_76/656 Installing air quality sensors

1. General requirements: Pr_75_50_76/651 Installing sensors generally
2. Room sensors
   2.1. Height: 1.5 m above floor.
   2.2. Position: Away from corners and doors.
   In the area controlled.

Ss_65_40_33/620 Installing natural ventilation systems

1. Installation: Install ductwork in runs that are as short and straight as possible, with smooth curvature to offsets.
2. Arrangement: Do not install ducts at more than 45° from vertical.
3. Air leakage: Prevent leakage where ducts enter rooms and around inlet grilles.

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: The Contractor shall allow for the supply and installation of new local wall mounted extract ventilation systems to serve the new WC within the STEPS building in accordance with the tender drawings and this specification.

   All fans provided as part of the mechanical ventilation installation shall be selected to comply with the specific fan power requirements as detailed in Approved Document Part L Volume 2.

   All ductwork shall be clean when erected and shall be continuously protected during installation against the ingress of dirt, debris and vermin.

   Allow to provide air transfer ducts/door transfer grilles/door undercuts as required to provide make-up air in accordance with the tender drawings.

   These systems are to be commissioned to provide the fresh air volume to satisfy the requirements of this document.
2. System performance: Ss_65_40_33/240 Ductwork design
3. Room extract air terminal devices: Pr_30_59_94_06 Air transfer grilles
4. Air ductwork and accessories
   4.1. Ductwork: Pr_65_65_25_14 Circular sheet metal ductwork and fittings
   4.2. Accessories: Pr_65_65_23_20 Duct access panels
5. Vibration isolation mountings: Include all measures available to isolate the transmission of noise and vibration from mechanical plant to the structure. All items of mechanical equipment including, but not limited to pumps, fans, condensers and air handling units shall have manufacturer supplied anti-vibration mounts.

   The Contractor shall be responsible for the selection and performance of all anti-vibration isolation material to satisfy the design requirements
6. Extract fans: Pr_65_67_29_05 Axial flow fans
7. External exhaust air terminals: Pr_30_59_48_04 Aluminium louvre panel units
8. Controls: Local standalone control.
9. Identification of ductwork and equipment: Pr_40_10_57_79 Self-adhesive plastics ductwork labels and transfers; Pr_40_10_57_51 Mechanical plant and equipment identification labels
10. Execution: Ss_65_40_33/630 Installing ductwork to fans and air-handling units
11. System completion: Ss_65_40_33/810 Commissioning of air distribution systems; Ss_60_40_92/850 Inspection and test records for underfloor heating and cooling systems; Ss_65_40_33/840 Training for ventilation systems operation; Ss_65_40_33/850 Record documentation for ventilation systems; Ss_65_40_33/860 Spares and consumables for ventilation systems; Ss_65_40_33/870 Maintenance of ventilation systems; Ss_65_40_33/830 Inspection and test records for ventilation systems

System performance

Ss_65_40_33/240 Ductwork design

1. Air velocity
   1.1. Standard: As CIBSE Guide B2.

1.2. Run-outs: Supply: 2 m/s.
Extract: 2.5 m/s.

2. Ductwork cleaning
   2.1. Standard: In accordance with BESA TR/19.
   2.2. Level of protection: Advanced PDI.
   2.3. Cleanliness quality class: High.

Products

See Pr_30_59_48_04 Aluminium louvre panel units in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_30_59_94_06 Air transfer grilles in Ss_65_40_33_56 Natural ventilation systems

See Pr_40_10_57_51 Mechanical plant and equipment identification labels in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57_79 Self-adhesive plastics ductwork labels and transfers in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_23_20 Duct access panels in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25_14 Circular sheet metal ductwork and fittings in Ss_65_40_33_51 Mechanical ventilation systems

Pr_65_67_29_05 Axial flow fans

1. Description: Supply and install new extract mechanical ventilation system to serve the new WC within Steps building as indicated on the tender drawings.

   This shall consist of an inline extract fan unit ducted to external louvres (to be agreed and coordinated with the Architect) and terminating in suitable extract grilles.

   Extract ventilation system shall be controlled as per the following:
   - Operate in trickle mode, boost via an integrated and 15-minute run on timer
2. Manufacturer: Nuaire
3. Product reference:: Opus40T-ESPF
4. Standards
   4.1. Performance: To BS EN ISO 5801.
   4.2. Configuration category:
   4.3. Mechanical safety: To BS EN ISO 12499.
   4.4. Electrical safety: To BS EN 60335-1 and BS EN 60335-2-80.
   4.5. Dimensions: To BS EN ISO 13351.
5. Duty
   5.1. Air volume: 25l/s
   5.2. Resistance: 20Pa (to be confirmed as part of detailed design)
6. Operating conditions
   6.1. Air density: 1.20 kg/m³.
7. Operation: Single.
8. Casing: Enclosing impeller only.
9. Accessories: Speed controller.
10. Execution: Pr_65_67_29/610 Installing fans generally

Execution

See Pr_40_10_57/611 Installing mechanical plant and equipment identification in Ss_55_70_38_15 Cold water supply systems

See Pr_40_10_57/650 Installing ductwork identification in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/610 Air ductwork generally in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/640 Installing sheet metal ductwork in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/670 Ductwork support for vapour seal continuity in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/690 Drainage of ductwork in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/700 Test holes in ductwork in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/740 Installing control equipment and instruments in metal ductwork in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/790 Air leakage testing of plant items in Ss_65_40_33_51 Mechanical ventilation systems

See Pr_65_65_25/795 Air leakage testing of low-pressure ductwork in Ss_65_40_33_51 Mechanical ventilation systems

Pr_65_67_29/610 Installing fans generally

1. Fixing: Use fixing points provided. Do not strain the fan structure when bolts are tightened.
2. Orientation: Mount impeller shaft horizontally.
3. Alignment: Install fan to allow optimum airflow path.

See Ss_65_40_33/630 Installing ductwork to fans and air-handling units in Ss_65_40_33_51 Mechanical ventilation systems

System completion

See Ss_60_40_92/850 Inspection and test records for underfloor heating and cooling systems in Ss_60_40_92_94 Underfloor low-temperature hot water heating systems

See Ss_65_40_33/810 Commissioning of air distribution systems in Ss_65_40_33_51 Mechanical ventilation systems

See Ss_65_40_33/830 Inspection and test records for ventilation systems in Ss_65_40_33_51 Mechanical ventilation systems

See Ss_65_40_33/840 Training for ventilation systems operation in Ss_65_40_33_51 Mechanical ventilation systems

See Ss_65_40_33/850 Record documentation for ventilation systems in Ss_65_40_33_51 Mechanical ventilation systems

See Ss_65_40_33/860 Spares and consumables for ventilation systems in Ss_65_40_33_51 Mechanical ventilation systems

See Ss_65_40_33/870 Maintenance of ventilation systems in Ss_65_40_33_51 Mechanical ventilation systems

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 Contractor shall provide an earthing system of sufficiently low impedance to facilitate the operation of the electrical system protective devices such that all earth faults are cleared within the time scales specified in BS 7671.
   The Contractor shall provide main and supplementary bonding in accordance with BS 7671, to create an equipotential zone of protection within all areas supplied by the associated electrical system, to ensure that all exposed conductive parts are at the same electrical potential as earth, and that personnel are not exposed to unsafe potentials under steady-state or fault conditions. All metalwork within the effected rooms shall be made electrically continuous throughout and connected to the main protective systems. This requirement shall apply to all building services armoured cables, cable trays, baskets, trunking, conduit, air ducts, pipes equipment and building fabric metalwork. This shall be effected using bonding conductors as necessary.
   The Contractor shall install a completely new earthing and bonding system for the building. Bonding will be carried out using yellow/green, LS0H insulated cable. The Contractor shall test the complete earthling system in accordance with BS 7430 and BS 7671. All earth cables shall be labelled.
   Cable glands shall have built-in earth terminals, securely bolted to the equipment. Connections from cable glands to earth terminals on equipment shall be by means of green/yellow coloured LS0H installed, single-core copper cables.
   The Contractor shall provide a clean earth system on each floor for the IT installation utilising a new earth bar. Any new cabinets shall be provided with earth bars inside the racks.
   For internal cables; metal trunking, conduits, etc. shall not be relied upon for use as the Circuit Protective Conductor (CPC) and separate Cu/LS0H or integral conductor CPCs shall be installed.
   For external cables; armouring shall not be relied upon for use as the Circuit Protective Conductor, however shall be connected to earth.
   CPC sizes shall be equal to the phase and neutral conductors (unless agreed otherwise and maintained compliant with standards as listed in this specification).
2. System performance: Ss_70_30_25/220 Electricity distributor's requirements; Ss_70_30_25/230 Equipotential bonding in buildings with information technology equipment
3. Main protective bonding conductors: Pr_65_70_48_75 Low-smoke halogen-free (LSHF) insulated single-core non-sheathed cables
4. Supplementary bonding conductors: Pr_65_70_48_75 Low-smoke halogen-free (LSHF) insulated single-core non-sheathed cables
5. Circuit protective conductors: Core of cable.
6. Earth terminal type: Pr_65_70_46_24 Earth bars
7. Accessories: Pr_65_70_46_29 Earthing clamps
8. Electrical identification: Pr_40_10_57_23 Electrical diagrams Pr_40_10_57_25 Electrical shock treatment signs; Pr_40_10_57_29 Equipment labels and warning notices
9. Execution: Ss_70_30_25/680 Installing supplementary bonding conductors; Ss_70_30_25/720 Notices and labels
10. System completion: Ss_70_30_25/810 Inspection and testing; Ss_70_30_25/820 Documentation

System performance

Ss_70_30_25/220 Electricity distributor's requirements

1. Evidence of compliance: Submit, in accordance with the requirements of the electricity distributor.

Ss_70_30_25/230 Equipotential bonding in buildings with information technology equipment

1. Standard: To BS EN 50310.
2. Objectives: To reduce the potential for touch voltages between items of IT equipment. To provide a common earth reference point for all equipment. To reduce the effects of electromagnetic interference.
3. Earthing network type: Star.

Products

Pr_40_10_57_23 Electrical diagrams

1. Description: The contractor shall supply and install a LV schematic within the
2. Material: Paper print, encapsulated.
3. Format: Single line engineering drawings to BS EN 61082-1.
4. Information to be included: Cable types and sizes. Protective device types, ratings and function. Switchgear ratings. Circuits containing equipment vulnerable to testing.
5. Size: A1.
6. Verification
   6.1. Submittals: Initial layout required to be submitted prior to starting on site
   The final version is to be wall mounted within the electrical plant room prior to handover

Pr_40_10_57_25 Electrical shock treatment signs

Shared by: Ss_70_30_80_35 Hardwired low-voltage small power systems

1. Description: The contractor shall provide shock treatment signs within both plantroom and within the service riser.
2. Manufacturer: Submit proposals
3. Format: Plastics-encapsulated.
4. Content: Text and images.
5. Geometric shape: Rectangular vertically.
6. Colours: Full colour.

Pr_40_10_57_29 Equipment labels and warning notices

Shared by: Ss_70_80_33_35 Hardwired general lighting systems and Ss_70_30_80_35 Hardwired low-voltage small power systems

1. Description: Provide equipment identification labels and warning notices for all equipment and exposed connections
2. Manufacturer: Submit proposals
3. Material: Face-engraved rigid plastic laminate.
4. Label size: To suit equipment or location.
5. Colour
   5.1. Background: White.
   5.2. Lettering: Black.
6. Notice wording: Distribution Board reference, as indicated on drawing.

Pr_65_70_46_24 Earth bars

1. Description: The contractor shall supply the main earth bar within the plant room and
2. Manufacturer: Submit proposals

3. Material
   3.1. Bar type: Hard drawn copper to BS EN 13601.
   3.2. Finish: Bare.
   3.3. Support: PVC-U.
4. Size
   4.1. Profile: 50 x 6 mm.
5. Predrilled connections (minimum): 20.
6. Disconnecting links: One.
7. Execution: Pr_65_70_46/610 Installing earth bars

Pr_65_70_46_29 Earthing clamps

1. Manufacturer: Submit proposals
2. Standard: To BS 951.
3. Material: Metallic dry conditions.
4. Cable capacity (minimum): 1 x 6 mm² conductor.

Pr_65_70_48_75 Low-smoke halogen-free (LSHF) insulated single-core non-sheathed cables

Shared by: Ss_70_80_33_35 Hardwired general lighting systems

1. Manufacturer: Contractor's choice
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. Reaction to fire class
   4.1. Fire behaviour: A_{ca}.
   4.2. Additional classification for smoke production: s1.
   4.3. Additional classification for flaming droplets and/ or particles: d0.
5. Execution: Pr_65_70_48/635 Installing low-voltage cables

Execution

Pr_65_70_46/610 Installing earth bars

1. Standards: In accordance with BS 7671 and BS 7430.
2. Main earth bar location: Next to the main switchboard.
3. Multiple earth bars: Connect with a conductor ring.
4. Mounting
   4.1. Orientation: Horizontal.
   4.2. Spacers: Ceramic.
   4.3. Support spacing (maximum): 300 mm for 25 mm bar, and 450 mm for 50 mm bar.
   4.4. Clearance between wall and earth bar (minimum): 30 mm.

Pr_65_70_48/635 Installing low-voltage cables

Shared by: Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables Type A , Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables and Pr_65_70_48_38 Heavy-duty cross-linked elastomeric-insulated and sheathed flexible 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. Exposed cable runs: Minimum 25 mm between cable face and structure.
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.

Ss_70_30_25/680 Installing supplementary bonding conductors

1. Earth connections: Connect with compression lugs.

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 'SAFETY/ TELECOMMS EARTH – DO NOT REMOVE'.

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): 2 weeks
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 (Ze): Direct measurement.
5. Earth fault loop impedance (Zs): 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. 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. 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 earth electrodes. Location of earth terminals.

2.2. Format: A1 paper print drawing. Electronic drawing.

2.3. Number of copies: Two.

3. Submittal date: At handover.

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: The contractor shall supply and install the new LV feed to the SEND block from the existing main LV panel within Block D.
   The contractor shall allow for the cable and all required containment and associated cable support to protect the cable along the entire route.
2. System performance: Ss_70_30_45/210 Design of incoming low-voltage electricity supply
3. Nature of current: Alternating.
4. Phase: Single-phase, three-wire.
5. Current:: 63A
6. Voltage: 230 V.
7. Metering: Single meter.
8. System completion: Ss_70_30_45/830 Documentation for incoming low-voltage electricity supply

System performance

Ss_70_30_45/210 Design of incoming low-voltage electricity supply

1. Standards: In accordance with BS 7671, as amended, and the electricity distributor's guidelines.

System completion

Ss_70_30_45/830 Documentation for incoming low-voltage electricity supply

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.
   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.
   2.3. Number of copies: Two.
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 Contractor shall include for the supply, installation, testing and commissioning of new electrical systems as indicated on the drawings and this specification.

   The contractor shall prior to installation cross reference with the elevation drawings and ensure that the interior designer is happy and no comments over positions.
2. System performance: Ss_70_30_80/215 Low-voltage small power cables generally; Ss_70_30_80/220 Conduit, trunking and ducting generally
3. Final circuit cabling: Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables Type A
4. Cable accessories: Pr_65_70_11_13 Cable cleats
5. Containment: Pr_65_70_11_17 Cable trays; Pr_65_70_11_19 Channel cable supports; Pr_65_70_11_96 Wall and ceiling-mounted cable trunking and ducting; Pr_65_70_11_12 Cable baskets; Pr_65_70_11_71 Rigid conduit
6. Containment accessories: Pr_65_70_11_20 Conduit fittings; Pr_25_80_81_44 Intumescent trunking pillows; Pr_25_80_81_45 Intumescent trunking pads
7. Rewireable installation: Required.
8. Concealed installation: Required where possible.
9. Partial installation: Required.
10. Final connections: Pr_65_70_48_38 Heavy-duty cross-linked elastomeric-insulated and sheathed flexible cables
11. Power conditioning equipment: The contractor shall allow to monitor the power conditioning during the 12 months defects. Should the overall building power factor be below 0.9, then the contractor shall supply, install test and commission power factor correction equipment prior to the end of the 12 months defects period.
12. Electrical accessories and outlets: Pr_65_72_97_30 Fan isolators; Pr_65_72_97_31 Fused connection units; Pr_65_72_97_84 Standard socket outlets; Pr_65_72_97_83 Surface and concealed wiring enclosures; Pr_40_70_62_37 Hand dryers
13. Electrical identification: Pr_40_10_57_23 Electrical diagrams; Pr_40_10_57_25 Electrical shock treatment signs; Pr_40_10_57_29 Equipment labels and warning notices
14. Execution: Ss_70_30_80/620 Installing low-voltage small power systems; Ss_70_30_80/630 Installing cabling to socket outlets
15. System completion: Ss_70_30_80/820 Documentation for low-voltage small power systems; Ss_70_30_80/830 Spares for low-voltage small power systems; Ss_70_30_80/840 Maintenance of low-voltage small power systems

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): 2.5 mm².
4. Cable sizes not stated: Submit.
5. Format: Amtech.

Ss_70_30_80/220 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

Pr_25_80_81_44 Intumescent trunking pillows

1. Description: The contractor shall be responsible for the supply, installation and record information including photographic schedule for provision of intumescent pillows within containment where this passes through fire compartments.
2. Manufacturer: Submit proposals
3. Standard: *Integrity: 180 minutes when tested to* BS 476-22
4. Third-party certification: LPCB-approved.
5. Size: To match containment size
6. Execution: Pr_65_70_11/700 Installing conduit, trunking and ducting

Pr_25_80_81_45 Intumescent trunking pads

1. Description: The contractor shall be responsible for the supply, installation and record information including photographic schedule for provision of intumescent pads within containment where this passes through fire compartments.
2. Manufacturer: Submit proposals
3. Standard: *Integrity: 180 minutes when tested to* BS 476-22
4. Third-party certification: LPCB-approved.
5. Size: To match containment size
6. Fixing: Self-adhesive.
7. Execution: Pr_65_70_11/700 Installing conduit, trunking and ducting

Pr_40_10_57_23 Electrical diagrams

1. Description: The contractor shall supply and install a LV schematic within the
2. Material: Paper print, encapsulated.
3. Format: Single line engineering drawings to BS EN 61082-1.
4. Information to be included: Cable types and sizes. Protective device types, ratings and function. Switchgear ratings. Circuits containing equipment vulnerable to testing.
5. Size: A1.
6. Verification
   6.1. Submittals: Initial layout required to be submitted prior to starting on site
   The final version is to be wall mounted within the electrical plant room prior to handover

See Pr_40_10_57_25 Electrical shock treatment signs 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_40_70_62_37 Hand dryers

1. Description: The contractor shall supply and install hand driers as indicated on the drawings. Each hand drier shall be served from a high level connection unit with a concealed flex down to the unit itself.

The contractor shall identify this cost as a PC sum within his tender return.

2. Manufacturer: phs Warner Howard
3. Contact details
   3.1. Address: c/o The PHS Group
   Claymore
   Tame Valley Industrial Estate
   Tamworth
   Staffordshire
   B77 5DQ
   3.2. Telephone: +44 (0)370 8504352
   3.3. Web: www.phswarnerhoward.co.uk
   3.4. Email: sales@phswarnerhoward.co.uk
4. Product reference: Airforce High Speed Low Energy Hand Dryer (BC0323)
5. Operation: Automatic.
6. Timer: Fixed.
7. Electrical supply
   7.1. Power rating: 1.1 kW.
   7.2. Rated operational voltage (Ue): 230 V a.c.
   7.3. Frequency: 50 Hz.
8. Body
   8.1. Material: Die-cast aluminium cover, polycarbonate ABS internal components.
   8.2. Finish: SteriTouch anti-bacterial surface finish.
   8.3. Ingress protection (minimum): IP24.
   8.4. Dimensions: 230 x 270 x 156 mm.
9. Speed: 37 000 rpm.
10. Weight: 3.2 kg.
11. Form: High-velocity air.
12. Operation: Automatic.
13. Electrical supply
   13.1. Power rating: 1.0 kW
   13.2. Frequency: 50 Hz.
   13.3. Final connection: Flexible cable concealed within the building fabric.
14. Body
   14.1. Material: Pressed metal.
   14.2. Finish: Polished. Antibacterial coating.
   14.3. Ingress protection (minimum): To BS EN 60529, IPX4.
   14.4. Dimensions: 300mm (w) x 670mm (h) x 219mm (d)
15. Noise level at 1 m (maximum): 60 dB(A).
16. Features: Hands only.
17. Warrenty: 6 years

Pr_65_70_11_12 Cable baskets

Shared by: Ss_75_50_28_29 Fire detection and alarm systems , Ss_75_10_21_21 Data distribution systems , Ss_70_80_33_35 Hardwired general lighting systems and Ss_75_40_53_86 Surveillance CCTV systems

1. Description: Supply, and install the complete containment system require to complete the installation and in accordance with BS 5839. Only manufacturer bends and accessories shall be installed.
2. Manufacturer: Contractor's choice
3. Standard: To BS EN 61537.
4. Material: 4 mm steel wire.
5. Resistance against flame propagation: Non-flame-propagating.
6. Electrical properties
   6.1. Continuity characteristics: With electrical continuity.
   6.2. Conductivity characteristics: Without electrical conductive system component.
7. Execution: Pr_65_70_11/630 Installing cable basket; Pr_65_70_11/650 Multiple cable runs; Pr_65_70_11/661 Cable support zones

Pr_65_70_11_13 Cable cleats

1. Manufacturer: Contractor's choice
2. Standard: To BS EN IEC 61914.
3. Format: To suit the proposed installation
4. Material: Metallic.
5. Resistance to impact: Heavy.
6. Environmental influences
   6.1. Non-metallic and composite components: Resistant to ultraviolet light.
   6.2. Metallic and composite components: High resistance against corrosion.

Pr_65_70_11_17 Cable trays

Shared by: Ss_75_10_21_21 Data distribution systems , Ss_70_80_33_35 Hardwired general lighting systems and Ss_75_40_02_11 Card access control systems

1. Description: Supply, and install the complete containment system required to complete the installation. Only manufacturer bends and accessories shall be installed.
2. Manufacturer: Contractor's choice
3. Standard: To BS EN 61537.
4. Material: Metal.
5. Electrical properties
   5.1. Continuity characteristics: With electrical continuity.
6. Coating material: Hot-dip-galvanized.
7. Mechanical properties
   7.1. Cable tray free base area: Class X.
   7.2. Resistance to impact: Up to 10 J.
8. Width: As indicated on the drawing
9. Features
   9.1. Flange type: Return.
   9.2. Segregation: Cable dividers, where noted on the drawings
   9.3. Protective cover: Not required.
10. Execution: Pr_65_70_11/621 Installing cable tray and cable ladder; Pr_65_70_11/640 Installing cable supports on roofs; Pr_65_70_11/650 Multiple cable runs; Pr_65_70_11/661 Cable support zones

Pr_65_70_11_19 Channel cable supports

1. Description: Supply, and install the complete containment support system as required to support the containment runs.
2. Manufacturer: Contractor's choice
3. Standard: To BS 6946.
4. Dimensions: 41 x 21 x 2.5 mm minimum
5. Material: Carbon steel.
6. Finish: Hot-dip-galvanized.
7. Accessories
   7.1. Manufacturer: As channel cable support.
   7.2. Type: 90° brackets. Baseplates. Beam clamps. End caps. Internal connectors. Threaded rod. Trapeze hangers.
8. Execution: Pr_65_70_11/610 Installing channel cable supports; Pr_65_70_11/640 Installing cable supports on roofs

Pr_65_70_11_20 Conduit fittings

Shared by: Ss_75_50_11_25 Emergency assistance call systems

1. Manufacturer:

   Match conduit.
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: Galvanised 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. Execution: Pr_65_70_11/700 Installing conduit, trunking and ducting

Pr_65_70_11_71 Rigid conduit

Shared by: Ss_75_50_28_29 Fire detection and alarm systems , Ss_75_50_11_25 Emergency assistance call systems , Ss_75_40_53_86 Surveillance CCTV systems and Ss_75_40_02_11 Card access control systems

1. Description: Conduits shall be installed in wall chases and ceiling voids in such a manner that inspection and draw boxes are at accessible positions.

   Conduit runs in suspended ceilings shall be fixed to the building structure and not to the ceiling.

   Where no ceilings are provided the contractor shall install the conduit in a clean manor remembering that this will be visible.
2. Manufacturer: Submit proposals
3. Standards: To BS EN 61386-1 and BS EN IEC 61386-21.
4. Mechanical properties
   4.1. Resistance to compression: Heavy.
   4.2. Resistance to impact: Heavy.
   4.3. Resistance to bending: Rigid.
   4.4. Tensile strength: Heavy.

4.5. Suspended load capacity: Heavy.

5. Electrical characteristics: With electrical continuity and insulating characteristics.
6. Resistance to external influences
   6.1. Protection against ingress of solid objects (minimum): To BS EN 60529, IP3X.
   6.2. Protection against ingress of water (minimum): To BS EN 60529, IPX0.
7. Execution: Pr_65_70_11/721 Installing rigid metallic conduit

Pr_65_70_11_96 Wall and ceiling-mounted cable trunking and ducting

Shared by: Ss_70_80_33_35 Hardwired general lighting systems

1. Description: Provide metal cable trunking as main service distribution routes and 3 compartment dado trunking to serve wall outlets as indicated on the drawings.
2. Manufacturer: Contractor's choice
3. Standards: To BS EN 50085-1 and BS EN 50085-2-1.
4. Installation position: As indicated on the drawings
5. Format: 2.
6. Resistance to flame propagation: Non-flame-propagating.
7. Electrical properties: With electrical continuity characteristics.
8. Protection by enclosure
   8.1. Protection against ingress of solid objects (minimum): To BS EN 60529, IP4X.
   8.2. Protection against ingress of water (minimum): To BS EN 60529, IPX1.
   8.3. Protection against access to hazardous parts (minimum): To BS EN 60529, IPXXD.
9. Access method: With tools.
10. Screening: Not required.
11. Sizes: As indicated on the drawings
12. Compartments: As indicated on the drawings
13. Accessories and fittings
    13.1. Generally: Factory-made by the cable trunking or ducting manufacturer and of the same material type and finish as the cable trunking or ducting.
14. Execution: Pr_65_70_11/741 Installing trunking generally; Pr_65_70_11/765 Conduit, trunking and ducting zones

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

1. Description: Supply and install FP200 enhanced cabling for the fire alarm loop cabling. All cabling shall be supplied and installed in accordance with manufacturer recommendations. All cabling shall be adequately supported using metallic fixings.
2. Manufacturer: Contractor's choice
3. Standard: To BS 7629-1.
4. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
5. Size: As per cable schedules
6. Fire resistance category: STANDARD 60. ENHANCED 120.
7. Execution: Pr_65_70_48/635 Installing low-voltage cables; Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

Pr_65_70_48_38 Heavy-duty cross-linked elastomeric-insulated and sheathed flexible cables

1. Manufacturer: Contractor's choice
2. Standards: To BS EN 50525-1 and BS EN 50525-2-21.
3. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
4. Cable type: H07RN-F.
5. Sheath colour: White.
6. Execution: Pr_65_70_48/665 Installing flexible cables

Pr_65_72_97_30 Fan isolators

1. Description: The contractor shall provide fan isolators as identified on the drawing
2. Manufacturer: To match socket outlets
3. Standards: To BS EN 60669-1 and BS EN 60669-2-4.
4. Current rating: 10 A.
5. Poles: Triple-pole.
6. Mounting: Surface.
7. Cable termination: Screwed.
8. Plate
   8.1. Material: Metal clad
9. Insert colour: Black.
10. Execution: Pr_65_72_97/610 Installing electrical accessories

Pr_65_72_97_31 Fused connection units

1. Description: The contractor shall supply, install and connect fused connection units as identified on the drawings
2. Manufacturer: To match the socket outlets
3. Standard: To BS 1363-4.
4. Control
   4.1. Type: Double-pole, switched.
   4.2. Indicator lamp: LED power 'On'.
5. Mounting: To suit location
6. Ingress protection (minimum): To BS EN 60529, IP20.
7. Cable termination: Screwed.
8. Fuse carrier access: Tamper-proof screw.
9. Execution: Pr_65_72_97/610 Installing electrical accessories

Pr_65_72_97_83 Surface and concealed wiring enclosures

1. Description: The contractor shall supply any enclosures required.
2. Manufacturer: Contractor's choice
3. Standards
   3.1. Concealed enclosures: To BS 4662.
   3.2. Surface enclosures: To BS 5733.
4. Enclosure
   4.1. Material: Stainless steel. Moulded plastics.
   4.2. Finish: Match conduit and trunking.

5. Execution: Pr_65_72_97/610 Installing electrical accessories

Pr_65_72_97_84 Standard socket outlets

1. Description: Sockets shall be provided throughout the installation as indicated on the drawings.
2. Manufacturer: Scolmore
3. Range: Mode
4. Standard: To BS 1363-2.
5. Arrangement: Twin-gang.
6. Control
   - 6.1. Type: Double-pole, switched.
   - 6.2. Switch position: Outboard.
   - 6.3. Indicator lamp: Not required.
7. Mounting: Flush. Grid. Surface.
8. Features: Dual earth terminals. Two no. 5 V d.c. 2.2 A USB charger ports.
9. Ingress protection (minimum): To BS EN 60529, IP20.
10. Cable termination: Screwed.
11. Plate
    - 11.1. Material: Plastic
    - 11.2. Finish: Natural
12. Execution: Pr_65_72_97/610 Installing electrical accessories

Execution

Pr_65_70_11/610 Installing channel cable supports

1. Standards: In accordance with BS 7671, IET Guidance Note 1 and BEAMA Best practice guide to cable ladder and cable tray systems: Channel support systems and other associated supports.
2. Preparation
   - 2.1. Burrs and sharp edges: Make smooth.
   - 2.2. Cutting: Minimize and make good edges. Cuts to slotted channel cable supports 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 channel cable supports to permit access for installing and maintaining cables.
4. Joints and expansion couplers
   - 4.1. Position: Locate between the bracket support and the quarter point.
   - 4.2. Number of joints: Minimize.
   - 4.3. Lengths of cable supports: Maximize.
5. Fire barriers: Provide where required to maintain fire performance of fabric.
6. Changes of size and direction: Manufacturer's accessories of the same material type, pattern, finish and thickness as channel cable supports.
7. Support
   - 7.1. Fixing arrangement: Independently fix and support from building structure using threaded rod fixed into expanding anchors.
   - 7.2. Clearance from building fabric (minimum): 20 mm.
8. Components: Avoid contact between dissimilar metals.
9. Routing of channel cable supports: Submit drawings showing the proposed routes.

Pr_65_70_11/621 Installing cable tray and cable ladder

1. Standards: In accordance with BS 7671 and IET Guidance Note 1.
2. Preparation
   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. Joints and expansion couplers
   4.1. Position: Locate between the bracket support and the quarter point.
   4.2. Number of joints: Minimize.
   4.3. Lengths of cable ladder and tray: Maximize.
   4.4. Ends: Blank with end plates.
5. Changes of size and direction: Manufacturer's accessories of the same material type, pattern, finish and thickness as cable supports.
6. Fire barriers: Provide where required to maintain fire performance of fabric.
7. Protective covers: Provide to cables requiring mechanical protection.
8. Support
   8.1. Fixing arrangement: Independently fix and support from building structure using threaded rod fixed to channel cable support with shake proof washers and hex nuts.
   8.2. Clearance from building fabric (minimum): 20 mm.
9. Components: Avoid contact between dissimilar metals.
10. 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

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_11/640 Installing cable supports on roofs

1. Position: Elevate above roof.
2. Mounting: Load-spreading supports.

Pr_65_70_11/650 Multiple cable runs

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

Pr_65_70_11/661 Cable support zones

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

Pr_65_70_11/700 Installing conduit, trunking and ducting

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: Galvanizing zinc rich paint, two coats.
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. Drainage of conduit, trunking and ducting: Locate drainage outlets at lowest points in conduit, trunking and ducting installed externally, and where condensation may occur.
7. Fire barriers: Provide to maintain integrity of fire compartments.
8. Rewireable installations: Enable rewiring from accessible boxes or accessories only.
9. Support: Independently fix and support conduit, trunking and ducting from building structure.
10. Cleaning: Clean insides of conduit, trunking and ducting before installing cables.
11. Cabling: Install when conduit, trunking and ducting enclosure is complete.
12. 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. Suspended ceiling installations: Fasten outlet boxes to structure above ceiling.

Pr_65_70_11/721 Installing rigid metallic conduit

1. General requirements: Pr_65_70_11/700 Installing conduit, trunking and ducting; Pr_65_70_11/710 Installing conduit generally
2. Fixings: 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_11/741 Installing trunking generally

1. Changes of direction: Manufacturer's bends and tees.
2. Joints
   2.1. Generally: Manufacturer's jointing fittings. Maintain rigidity of trunking across joint.
   2.2. Number of joints: Minimize.
   2.3. Lengths of trunking: Maximize.
   2.4. Open ends: Blank using manufacturer's removable end caps.
   2.5. Metal edging: Protect with PVC edging strip.
   2.6. Electrical continuity: Maintain at each joint with a copper link fitted on the outside of the trunking.
3. Connections to conduit, boxes, equipment and accessories: Screwed couplings, adaptors, connectors and glands, with rubber bushes at open ends.
4. Connections to trunking covers: Minimize.
5. Electrical continuity of covers: Electrically continuous with the trunking or provide protective conductors.
6. Access: Provide space around trunking to permit access for installing and maintaining cables. Set out access with covers on a continuous face to allow cabling to be laid in throughout its entire length.
7. Trunking passing through building fabric openings: Provide fixed trunking covers. Extend covers 50 mm from both sides of the opening.
8. Cable-retaining straps: Required except when trunking cover is on top.

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.

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

Shared by: Pr_65_70_15_06 Balanced twisted pair cables and Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables

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_48/665 Installing flexible cables

1. General requirements: Pr_65_70_48/635 Installing low-voltage cables
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_72_97/610 Installing electrical accessories

Shared by: Pr_70_75_04_06 Balanced twisted pair cable outlet plates and Pr_65_72_97_46 Light switches

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: 900 mm
   - 6.3. Socket outlets: 1100 mm
   - 6.4. Fan isolators: 1500 mm
   - 6.5. Telecommunications and data outlets: 1100 mm
7. Separation distance between adjacent accessories (minimum): 30 mm.

Ss_70_30_80/620 Installing low-voltage small power systems

1. Standard: In accordance with BS 7671.

Ss_70_30_80/630 Installing cabling to socket outlets

1. General: Wire socket outlets in ring final circuits without spurs where hard wiring is employed.

System completion

Ss_70_30_80/820 Documentation for low-voltage small power 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: Paper copy.
   - 1.4. Number of copies: Two.
2. Record drawings
   - 2.1. Content: 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. Location of LV switchgear including distribution boards. Location, route and depth of underground cables. 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.

2.2. Format: A1 paper print drawing. Electronic drawing.

2.3. Number of copies: Two.

3. Submittal date: At handover.

Ss_70_30_80/830 Spares for low-voltage small power systems

1. Plugs: Supply two for each socket outlet type.
2. Fuse links: Supply ten of each rating.

Ss_70_30_80/840 Maintenance of low-voltage small power systems

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

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 Contractor shall supply, offload, install, test and commission the complete lighting installation to suit the design and the light levels indicated on the project drawings. The complete lighting installation shall comply with all relevant British statutory requirements, regulations, codes of practice
2. System performance: Ss_70_80_33/215 Design of emergency lighting systems; Ss_70_80_33/210 Design of general lighting systems; Ss_70_80_33/270 Lighting cables generally; Ss_70_80_33/280 Conduit, trunking and ducting generally; Ss_70_80_33/240 Lighting performance
3. Final circuit cabling: Pr_65_70_48_75 Low-smoke halogen-free (LSHF) insulated single-core non-sheathed cables
4. Containment: Pr_65_70_11_17 Cable trays; Pr_65_70_11_12 Cable baskets; Pr_65_70_11_96 Wall and ceiling-mounted cable trunking and ducting
5. Rewireable installation: Required.
6. Concealed installation: Required as far as possible.
7. Luminaire types: Pr_70_70_48_25 Emergency luminaires; Pr_70_70_48_71 Recessed luminaires; Pr_70_70_48_86 Suspended luminaires; Pr_70_70_48_85 Surface luminaires
8. Lamp types: Pr_70_70_46_78 Self-ballasted LED lamps
9. Lighting controls: Pr_70_70_47_45 Lighting control modules; Pr_70_70_47_21 Daylight sensors; Pr_65_72_97_46 Light switches
10. Electrical identification: Pr_40_10_57_29 Equipment labels and warning notices
11. Execution: Ss_70_80_33/630 Installing general lighting systems; Ss_70_80_33/640 Installing emergency lighting systems; Ss_70_80_33/720 Labelling of lighting controls
12. System completion: Ss_70_80_33/810 Testing and commissioning of general lighting systems; Ss_70_80_33/812 Testing and commissioning emergency lighting systems; Ss_70_80_33/820 Documentation relating to general lighting; Ss_70_80_33/822 Documentation relating to emergency lighting; Ss_70_80_33/830 Spares for lighting systems; Ss_70_80_33/840 Maintenance of lighting systems

System performance

Ss_70_80_33/210 Design of general lighting systems

1. Design: Complete commissioning checklist in accordance with Commissioning Code L, Appendix LA2.
2. Standard: In accordance with SLL Code for lighting.
3. Submit the following information: Lamp and luminaire technical information. Luminaire layout drawings.

Ss_70_80_33/215 Design of emergency lighting systems

1. System designer: The emergency lighting testing system shall be local key switches.
2. Design: Complete the design of the emergency lighting and signage systems.
3. Standards: To BS EN 1838, BS EN 50172 and in accordance with BS 5266-1.
4. Submit the following information: Lamp and luminaire technical information. Luminaire layout drawings.
5. Emergency lighting classification

5.1. Type: X.

5.2. Duration of emergency mode: 180 minutes.

Ss_70_80_33/240 Lighting performance

1. Task area: Depending on area however in accordance with ILP requirements.
2. Glare index (maximum): 25.
3. Uniformity (minimum): 0.7.
4. Colour rendering index (Ra): 80–89.
5. Colour temperature (K): 4000 internally
   3000 externally
6. Means of control: Local.

Ss_70_80_33/270 Lighting cables generally

1. Standard: In accordance with BS 7671.
2. Requirement: Submit proposals, including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Conductor sizes (minimum)
   3.1. Lighting circuits: 1.5 mm².
   3.2. Final connection: 1.5 mm².
4. Cable sizes not stated: Submit.

Ss_70_80_33/280 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

See Pr_40_10_57_29 Equipment labels and warning notices in Ss_70_30_25_25 Earthing and bonding systems

See Pr_65_70_11_12 Cable baskets in Ss_70_30_80_35 Hardwired low-voltage small power 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_11_96 Wall and ceiling-mounted cable trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_48_75 Low-smoke halogen-free (LSHF) insulated single-core non-sheathed cables in Ss_70_30_25_25 Earthing and bonding systems

Pr_65_72_97_46 Light switches

1. Description: Provide light switches as indicated on the drawings
2. Manufacturer: Same as socket Outlets
3. Standard: To BS EN 60669-1.
4. Actuating method: Rocker.
5. Arrangement: As indicated on the drawings
6. Mounting: Flush.
7. Cable termination: Screwed.

8. Execution: Pr_65_72_97/610 Installing electrical accessories

Pr_70_70_46_78 Self-ballasted LED lamps

1. Description: All fittings to be provided complete LED lamps or chip boards.
2. Manufacturer: As per luminaire Schedule
3. Standards: To BS EN 62560 and BS EN 62612.
4. Third-party certification: BSI Kitemark-approved.
5. Wattage: As per luminaire Schedule
6. Colour temperature: As per luminaire Schedule
7. Colour rendering index (Ra): As per luminaire Schedule
8. Rated life (minimum): 80,000 hours
9. Initial lumens (minimum): As per luminaire Schedule
10. Rated lamp efficacy (minimum): As per luminaire Schedule

Pr_70_70_47_21 Daylight sensors

1. Description: The contractor shall supply and install all required PIR/ Absence detectors c/w daylight sensors.
   All sensors shall be provided as indicated on the drawings and to provide the best daylight saving possible.
2. Manufacturer: Submit proposals
3. Standards: To BS EN 60669-1 and BS EN 60669-2-1
4. Equipment interconnectivity: Hardwired.
5. Light level sensor: Integral and adjustable.
6. Remote set-up/ override: By infrared controller.
7. Mounting: Flush.
   Ceiling.
   Surface.
8. Execution: Pr_70_70_47/640 Installing daylight sensors

Pr_70_70_47_45 Lighting control modules

1. Description: The control can use lighting control modules where ceilings are present however these must not affect the performance of the system.
2. Manufacturer: Contractor's choice
3. Standards: To BS EN 60669-1, BS EN 60669-2-1 and BS EN 60669-2-5.
4. Controller type: Microprocessor-controlled.
5. Equipment interconnectivity: Hardwired.
6. Rated voltage: 230 V a.c.
7. Control protocol: 0–10 V.
   Digital serial interface (DSI).
8. Addressable input ports: Ten.
9. Addressable output ports: Ten.
10. Execution: Pr_70_70_47/620 Installing lighting control modules

Pr_70_70_48_25 Emergency luminaires

1. Description: The contractor shall provide emergency fittings as indicated on the drawings.
2. Manufacturer: As per Luminaire schedule

3. Standards: To BS EN IEC 60598-1, BS EN IEC 60598-2-1 ,BS EN 60598-2-2 and BS EN 60598-2-22.
4. Third-party certification: ICEL product endorsement scheme.
5. Luminaire description: Refer to luminaire schedule
6. Classification
   6.1. Ingress protection (minimum): As per luminaire schedule
   6.2. Suitability for direct mounting on normally flammable surfaces: Suitable for direct mounting on normally flammable surfaces.
   6.3. Circumstances of use: Normal.
   6.4. Type: X.
   6.5. Mode of operation: 0.
   6.6. Facilities: F.
   6.7. Duration of emergency mode (minimum): 180.
7. Luminaire performance: To BS EN 62722-1 and BS EN 13032-1.
8. Controlgear position: Integral within luminaire.
9. Supply circuit conductor connections: Screw terminals.
10. Nominal voltage: 230 V a.c.
11. Luminaire power factor: Correct to minimum 0.9 lagging.
12. LED luminaires
    12.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.
    12.2. Safety standard: To BS EN IEC 62031.
    12.3. Initial LED luminaire efficacy (minimum): Refer to luminaire schedule
    12.4. Wattage: Refer to luminaire schedule
    12.5. Colour temperature: Refer to luminaire schedule
    12.6. Colour rendering index (Ra): Refer to luminaire schedule
    12.7. Beam angle: Refer to luminaire schedule
    12.8. Useful life: Submit as part of technical submission
13. Graphical symbol format: European format sign, running man, arrow left.
    European format sign, running man, arrow right.
    European format sign, running man, arrow up.
    European format sign, running man, arrow down.
    To BS 5499-1.
14. Execution: Pr_70_70_48/610 Luminaire samples; Pr_70_70_48/620 Installing luminaires and lamps generally; Pr_70_70_48/630 Luminaire cable connections; Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling; Pr_70_70_48/690 Installing luminaire supports

Pr_70_70_48_71 Recessed luminaires

1. Description: The contractor shall provided luminaires as indicated on the drawings and luminaire schedule.
2. Manufacturer: Refer to luminaire schedule
3. Standards: To BS EN IEC 60598-1 and BS EN 60598-2-2.
4. Third-party certification: ICEL product endorsement scheme.
5. Luminaire description: Refer to luminaire schedule
6. Classification
   6.1. Ingress protection (minimum): Refer to luminaire schedule
   6.2. Suitability for direct mounting on normally flammable surfaces: Suitable for direct mounting on normally flammable surfaces.

6.3. Circumstances of use: Normal.
7. Impact protection (minimum): Refer to luminaire schedule
8. Luminaire performance: To BS EN 62722-1 and BS EN 13032-1.
9. Controlgear position: Integral within luminaire.
10. Supply circuit conductor connections: Screw terminals.
11. Nominal voltage: 230 V a.c.
12. Luminaire power factor: Correct to minimum 0.9 lagging.
13. LED luminaires
    13.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.
    13.2. Safety standard: To BS EN IEC 62031.
    13.3. Initial LED luminaire efficacy (minimum): Refer to luminaire schedule
    13.4. Wattage: Refer to luminaire schedule
    13.5. Colour temperature: Refer to luminaire schedule
    13.6. Colour rendering index (Ra): Refer to luminaire schedule
    13.7. Beam angle: Refer to luminaire schedule
14. Dimming protocol: Analogue 0–10 V d.c.
15. Emergency version
    15.1. Standard: To BS EN 60598-2-22.
    15.2. Classification
        15.2.1. Type: Pr_70_70_48_25 Emergency luminaires
        15.2.2. Mode of operation: Pr_70_70_48_25 Emergency luminaires
        15.2.3. Facilities: Pr_70_70_48_25 Emergency luminaires
        15.2.4. Duration of emergency mode (minimum): Pr_70_70_48_25 Emergency luminaires
16. Integral sensors: Refer to Luminaire Schedule
17. Accessories: Integral presence detector.
18. Execution: Pr_70_70_48/690 Installing luminaire supports; Pr_70_70_48/670 Installing controlgear; Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling; Pr_70_70_48/620 Installing luminaires and lamps generally

Pr_70_70_48_85 Surface luminaires

1. Description: The contractor shall provided luminaires as indicated on the drawings and luminaire schedule.
2. Manufacturer: Refer to luminaire schedule
3. Standard: To BS EN IEC 60598-1 and BS EN IEC 60598-2-1.
4. Third-party certification: ICEL product endorsement scheme.
5. Luminaire description: Refer to luminaire schedule
6. Classification
    6.1. Ingress protection (minimum): Refer to luminaire schedule
    6.2. Suitability for direct mounting on normally flammable surfaces: Refer to luminaire schedule
    6.3. Circumstances of use: Normal.
7. Impact protection (minimum): Refer to luminaire schedule
8. Luminaire performance: To BS EN 62722-1 and BS EN 13032-1.
9. Controlgear position: Integral within luminaire.
10. Supply circuit conductor connections: Screw terminals.
11. Nominal voltage: 230 V a.c.

12. Luminaire power factor: Correct to minimum 0.9 lagging.
13. LED luminaires
    13.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.
    13.2. Safety standard: To BS EN IEC 62031.
    13.3. Initial LED luminaire efficacy (minimum): Refer to luminaire schedule
    13.4. Wattage: Refer to luminaire schedule
    13.5. Colour temperature: Refer to luminaire schedule
    13.6. Colour rendering index (Ra): Refer to luminaire schedule
    13.7. Beam angle: Refer to luminaire schedule
14. Dimming protocol: Analogue 0–10 V d.c.
15. Emergency version
    15.1. Standard: To BS EN 60598-2-22.
    15.2. Classification
        15.2.1. Type: Pr_70_70_48_25 Emergency luminaires
        15.2.2. Mode of operation: Pr_70_70_48_25 Emergency luminaires
        15.2.3. Facilities: Pr_70_70_48_25 Emergency luminaires
        15.2.4. Duration of emergency mode (minimum): Pr_70_70_48_25 Emergency luminaires
16. Integral sensors: Refer to luminaire schedule
17. Execution: Pr_70_70_48/690 Installing luminaire supports; Pr_70_70_48/670 Installing controlgear; Pr_70_70_48/630 Luminaire cable connections; Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling

Pr_70_70_48_86 Suspended luminaires

1. Description:

   The contractor shall provided luminaires as indicated on the drawings and luminaire schedule.
2. Manufacturer: Refer to luminaire schedule
3. Standards: To BS EN IEC 60598-1 and BS EN IEC 60598-2-1.
4. Third-party certification: ICEL product endorsement scheme.
5. Luminaire description: Refer to luminaire schedule
6. Classification
    6.1. Ingress protection (minimum): Refer to luminaire schedule
    6.2. Suitability for direct mounting on normally flammable surfaces: Suitable for direct mounting on normally flammable surfaces.
    6.3. Circumstances of use: Normal.
7. Luminaire performance: To BS EN 62722-1 and BS EN 13032-1.
8. Controlgear position: Integral within luminaire.
9. Supply circuit conductor connections: Screw terminals.
10. Nominal voltage: 230 V a.c.
11. Luminaire power factor: Correct to minimum 0.9 lagging.
12. LED luminaires
    12.1. Performance standards: To BS EN 62717 and BS EN 62722-2-1.
    12.2. Safety standard: To BS EN IEC 62031.
    12.3. Initial LED luminaire efficacy (minimum): Refer to luminaire schedule
    12.4. Wattage: Refer to luminaire schedule
    12.5. Colour temperature: Refer to luminaire schedule

12.6. Colour rendering index (Ra): Refer to luminaire schedule
12.7. Beam angle: Refer to luminaire schedule
12.8. Useful life: Refer to luminaire schedule
13. Dimming protocol: Analogue 0–10 V d.c.
14. Emergency version
14.1. Standard: To BS EN 60598-2-22.
14.2. Classification
14.2.1. Type: Pr_70_70_48_25 Emergency luminaires
14.2.2. Mode of operation: Pr_70_70_48_25 Emergency luminaires
14.2.3. Facilities: Pr_70_70_48_25 Emergency luminaires
14.2.4. Duration of emergency mode (minimum): Pr_70_70_48_25 Emergency luminaires
15. Integral sensors: Refer to luminaire schedule
16. Execution: Pr_70_70_48/690 Installing luminaire supports; Pr_70_70_48/620 Installing luminaires and lamps generally; Pr_70_70_48/630 Luminaire cable connections

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_11/630 Installing cable basket in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/640 Installing cable supports on roofs 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_11/700 Installing conduit, trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/741 Installing trunking generally in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/765 Conduit, trunking and ducting 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_72_97/610 Installing electrical accessories in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_70_70_47/605 Installing automatic lighting controls generally

1. Standard: In accordance with BS 7671.
2. Equipment and sensor identification labels: Provide.

Pr_70_70_47/620 Installing lighting control modules

1. General requirements: Pr_70_70_47/605 Installing automatic lighting controls generally
2. Position: Wall-mounted above suspended ceilings.
3. Connection to building monitoring and management system: Required.

4. Interconnections with detectors, sensors and luminaires
   4.1. Connection topology: Interconnect between control panel and detectors, sensors and luminaire on a radial.
   4.2. Cable type: Balanced twisted pair cables.
5. Software addressing: Assign individual, unique software address to detectors, sensors and luminaires.
6. Output circuits: Label describing purpose.

Pr_70_70_47/640 Installing daylight sensors

1. General requirements: Pr_70_70_47/605 Installing automatic lighting controls generally
2. Position: As indicated on the drawings
3. Interconnection: To local group of luminaires
4. Cable type: Polyvinyl chloride (PVC)-insulated and sheathed cables.

Pr_70_70_48/610 Luminaire samples

1. Sample luminaires: Contractor to provide a sample of each type of fitting for approval. Samples maybe used providing no damage as part of final installation.
2. Submittals: Include manufacturer's technical information with each sample.
3. Identification: Label samples with the luminaire references.

Pr_70_70_48/620 Installing luminaires and lamps generally

1. Orientation: Linear luminaires to be installed parallel with ceiling.
2. Lamps and accessories: Provide.
3. Supports: All luminaires are to be provided secondary supports, adequate for weight of luminaire.

Pr_70_70_48/630 Luminaire cable connections

1. Cable connection size (minimum): 1.5 mm².
2. Connection of luminaire-supporting couplers
   2.1. General luminaires: White plug with white cover.
   2.2. Flex length (maximum): 2 m.
3. Suspended trunking
   3.1. Final connection: Luminaire supporting couplers.
   3.2. Mounting arrangement: From cable connection on side of trunking.
   3.3. Cable type: Ordinary-duty cross-linked elastomeric-insulated and sheathed heat-resistant flexible cables.
4. Rod-suspended or chain-suspended
   4.1. Final connection: Luminaire supporting couplers.
   4.2. Cable type: Ordinary-duty cross-linked elastomeric-insulated and sheathed heat-resistant flexible cables.
   4.3. Connection arrangement: Clipped to chain or rod. Do not pass cord through chain links.
5. Cable entry: Grommeted.
6. Class 1 earth connections: Connect to luminaire circuit protective conductor.
7. Wiring within luminaires: Minimize. Clip at 300 mm intervals.

Pr_70_70_48/640 Luminaires mounted as part of a suspended ceiling

1. Luminaire supports: Independent suspension wires. Support from ceiling.
2. Luminaire final connection: Luminaire supporting couplers.

3. Mounting arrangement: From cable connection on side of trunking.
4. Length (maximum): 2 m.

Pr_70_70_48/670 Installing controlgear

1. Position: Within 1 m of luminaire.
2. Fixing: Secure to building fabric.

Pr_70_70_48/690 Installing luminaire supports

1. Support and fixing arrangement: Provide adequate support and fixing arrangements for the fitting in accordance with manufacturers requirements.
2. Luminaire suspensions: Vertical.
3. Multiple suspensions: Provide as necessary.
4. Levelling: Adjust the length of suspensions so that luminaires are level.
5. Levelling tolerance: ± 3 mm.
6. Conduit supports
   6.1. Size (minimum): 20 mm.
   6.2. Type: Match cable containment.
7. Conduit boxes: Provide for each luminaire suspension point.
8. Rod supports: Continuously threaded rods.
9. Chain supports: Steel chain with conduit box hook and cover.
10. Ball and socket: Provide as top support and fix cover to circular conduit box. Route cable from conduit box through ball and socket.
11. Number of supports for luminaires longer than 600 mm (minimum)
    11.1. Luminaire width <300 mm: Two.
    11.2. Luminaire width >300 mm: Four.

Ss_70_80_33/630 Installing general lighting systems

1. Standard: In accordance with BS 7671 and CIBSE Commissioning Code L.
2. Commissioning method statement: Submit prior to commissioning.
3. Luminaire layout: As indicated on the drawings
4. Fixing master/ lighting distribution boxes: Direct to underside of floor slab.
5. Connection of luminaire-supporting couplers
   5.1. General luminaires: White plug with white cover.
   5.2. Flex length (maximum): 2 m.
6. Switches and controls
   6.1. Location: As indicated on the drawings
   6.2. Staircases: Two-way switching at top and bottom landings with intermediate at full landings.
7. Rooms smaller than 4 m²: Restrict lighting circuits to one electrical phase.

Ss_70_80_33/640 Installing emergency lighting systems

1. Standards: In accordance with BS 5266-1 and BS 7671.
2. Connection of luminaire-supporting couplers
   2.1. Emergency luminaires: Red plug with red cover.
   2.2. Flex length (maximum): 2 m.
3. Permanent electrical supplies to self-contained emergency luminaires: Derive from the closest general lighting circuit.

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.
   In accordance with PD ISO/TS 21274.
2. Test results: Submit two copies of system commissioning completion certificate in accordance with CIBSE Commissioning Code L, Appendix LA4.
   Submit two copies of system commissioning completion certificate in accordance with in accordance with PD ISO/TS 21274, Annex A, Table A.1 and Table A.2.
3. Certificates of calibration for meters and instruments: Submit.

Ss_70_80_33/812 Testing and commissioning emergency lighting systems

1. Commissioning: In accordance with BS 5266-1, Annex H.
2. Results: Submit two copies of emergency lighting completion certificates, in accordance with BS 5266-1, Annex H, Figures H.1, H.2, H.3, and H.4.
3. 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.
   1.3. Format: Paper copy.
   1.4. Number of copies: Two.
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 .
   Schematic diagram showing all final circuit cabling, the cable origin, device addresses for automated controls, route from controls to luminaires, and the location of all joints and tees. 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: A1 paper print drawing.
   Electronic drawing.
   2.3. Number of copies: Two.
3. Submittal date: At handover

Ss_70_80_33/822 Documentation relating to emergency 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.

1.3. Format: Paper copy.

1.4. Number of copies: Two.

2. Record drawings

2.1. Content: General arrangement drawings showing the location of emergency luminaires, lighting circuit distribution boxes, master and slave distribution boxes, switch modules, manual and automatic emergency lighting test panels .
Schematic diagram showing all final circuit cabling, the cable origin, device addresses for automated controls, route from controls to luminaires, and the location of all joints and tees. 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: A1 paper print drawing.
Electronic drawing.

2.3. Number of copies: Two.

3. Submittal date: At handover.

4. Certification for re-engineered luminaires: For each different product, submit evidence of registration to the ICEL endorsement scheme.

5. Logbook: Submit, including the following information: date of commissioning of the system, including any certificate relating to alterations;

Date of each periodic inspection and test;

Date and brief details of each service, inspection or test carried out;

Dates and brief details of any defects and of remedial action taken;

Date and brief details of any alteration to the emergency lighting installation;

If any automatic testing device is employed, a description of the main characteristic and the mode of operation;

Details of replacement components

of luminaires such as lamp type, battery and fuses.

Ss_70_80_33/830 Spares for lighting systems

1. Test keys for secret keyswitches: Three.
2. Sensors: One of each type.

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. Description: The contractor shall supply, install, test and commission the complete data network installation.

   The installation shall comprise of all required equipment, interconnection cabling, cable management required to form the complete installation.

   Cabling to be distributed via cable basket, trunking and 3 compartment dado trunking. The final positions of outlets are to allow for flexibility and to minimise trailing leads.

   The maximum length for any cable will be 80m. If it is identified that circuits may exceed this figure, they will require the consideration of the use of fibre optic cable and conversion equipment at each end.
2. System performance: Ss_75_10_21/260 Connections with other systems
3. Applications: PoE Type 4 (BS ISO/IEC/IEEE 8802-3 bt Power over Ethernet). 10GBase-T (BS ISO/IEC/IEEE 8802-3 an 10 gigabit Ethernet). Voice (digital).
4. Cabling hierarchy
   4.1. Building distributors (BD): Pr_80_77_28_06 Balanced twisted pair cabling patch panels; Pr_80_77_28_27 Fibre-optic patch panels; Pr_80_77_28_21 Data equipment cabinets
   4.2. Building backbone cabling: Pr_65_70_15_58 Optical fibre cables
   4.3. Horizontal cabling: Pr_65_70_15_06 Balanced twisted pair cables
   4.4. Telecommunications outlets (TO): Pr_70_75_04_06 Balanced twisted pair cable outlet plates
5. Containment: Pr_65_70_11_12 Cable baskets; Pr_65_70_11_17 Cable trays
6. Rewireable installation: Required.
7. Concealed installation: Required, Where possible
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
9. Execution: Ss_75_10_21/650 Installing cabinets; Ss_75_10_21/625 Installing information technology cabling; Ss_75_10_21/670 Labelling of data distribution systems components
10. System completion: Ss_75_10_21/850 Data distribution system warranty; Ss_75_10_21/840 Maintenance of data distribution systems; Ss_75_10_21/820 Documentation for data distribution systems; Ss_75_10_21/810 Testing and inspection of data distribution systems

System performance

Ss_75_10_21/260 Connections with other systems

1. Requirements: The contractor shall allow to connect any other system to the data network as required and where indicated on the drawing.

Products

Pr_40_10_57_88 Telecommunications equipment and outlets labels

1. Description: The contractor shall provide each outlet and patch panel with the port number. The contractor shall ensure that prior to handover that every port is labelled and all documentation

2. Manufacturer: Submit proposals
3. Material: Machine-printed adhesive label.
4. Colour
   4.1. Background: White
   4.2. Lettering: Black
5. Typography
   5.1. Font: Contractors Choice
   5.2. Size: Contractors Choice
6. Content: CR (Then computer room number)/Port number
7. Verification
   7.1. Submissions: Provide all details
   7.2. Timing: To suit the programme remembering to allow time for reviews and resubmissions if required.

See Pr_65_70_11_12 Cable baskets in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11_17 Cable trays in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_65_70_15_06 Balanced twisted pair cables

1. Description: The contractor shall supply and install all require cabling to form the complete installation.
2. Manufacturer: Submit proposals
3. Standard: To BS EN 50173-1.
4. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
5. Category: 6.
6. Cable type: F/FTP.
   SF/FTP.
   S/FTP.
7. Sheath
   7.1. Type: LSHF.
   7.2. Colour: Purple.
8. Reaction to fire class
   8.1. Fire behaviour: A_{ca}.
   8.2. Additional classification for smoke production: s1.
   8.3. Additional classification for flaming droplets and/ or particles: d0.
9. Execution: Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

Pr_65_70_15_58 Optical fibre cables

1. Description: Provide a new fibre connection from the
2. Manufacturer: Contractor's choice
3. Standard
   3.1. Multimode: To BS EN IEC 60793-2-10.
4. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
5. Physical characteristics: Multimode 62.5/ 125 µm.
6. Category: OM2.
7. Sheath
   7.1. Material: LSHF.

8. Environment: Indoors.

Pr_70_75_04_06 Balanced twisted pair cable outlet plates

1. Description: The contractor shall supply and install all RJ45 outlets.
   Outlets shall be angled outlets. All outlets shall generally match the finish of other outlets within the space.

   All outlet will be labelled and left in full working order.
2. Manufacturer: To match socket outlets
3. Standard: To BS EN 50173-1.
4. Category: 6.
5. Screening: Match cabling.
6. Outlet arrangement: 45° angled.
7. Outlet ports: Double RJ45.
8. Spring-loaded shutter: Required.
9. Circuit designation label with transparent cover: Required.
10. Cable termination: Insulation displacement connection (IDC).
11. Execution: Pr_65_72_97/610 Installing electrical accessories

Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices

Shared by: Ss_75_40_53_86 Surveillance CCTV systems

1. Description: The contractor shall allow to provide surge protection with Computer Room 1 & Computer Room 2.
2. Manufacturer: Dehn
3. Standard: To BS EN 61643-21.
4. Mode of protection: Lines to earth, lines to lines.
5. Mounting method: Suitable for DIN rail.
6. Execution: Pr_70_75_88/620 Installing data and telecom transient overvoltage surge suppression devices

Pr_80_77_28_06 Balanced twisted pair cabling patch panels

1. Description: The contractor shall supply and install all required patch panels to connect all outlets.
   All patch panels shall be 24 port and PoE enabled.
   Each patch panel shall be provided with all required cable management around the panel.
   The contractor shall supply prior to installation full details and cabinet layouts for comment and approval.
2. Manufacturer: Contractor's choice
3. Standard: To BS EN 50173-1.
4. Arrangement: 19 inch with pre-drilled rear gland holes with integral cable clamps and fixed tray.
5. Ports with RJ-45 outlets: 24.
6. Category: 6.
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. Description: The contractor shall supply and install all required cable cabinets.
2. Manufacturer: Submit proposals
3. Format: To accept 19 inch racking with front and rear adjustable rails.
4. Enclosure
   - 4.1. Mounting: Free standing.
     Wall.
   - 4.2. Size
     - 4.2.1.Width: 800 mm
     - 4.2.2.Depth: 1000 mm.
     - 4.2.3.Height: 12 U.
   - 4.3. Wall mounted cabinet
     - 4.3.1.Width:: 800 mm
     - 4.3.2.Depth:: 800 mm
     - 4.3.3.Height:: Minimum 20U
   - 4.4. Material: Steel.
   - 4.5. Finish: Black epoxy powder coating.
   - 4.6. Front door: Steel with lock.
   - 4.7. Rear door: Steel with lock.
   - 4.8. Side panels: Fixed.
   - 4.9. Base: Height adjustable supports.
5. Cabinet locks: Common key.
6. Ventilation: Air vents on both side panels providing natural ventilation.
   Air vents on both side panels and integral fan providing mechanical extraction of warm air.
7. Socket outlets
   - 7.1. Type: To BS 1363-2.
   - 7.2. Arrangement: One vertical power module with eight outlets mounted at rear and master power switch at front.
8. Space for active equipment: 12 U.
9. Cable entry with grommets: Top. Bottom.
10. Horizontal cable supports: 1 U for each 1 U patch panel with 1 U spare.
11. Vertical cable supports: Left and right hand sides at 8 U spacing.
12. Spare U sections: Provide individual blanking plates.
13. Accessories: Vented equipment shelf.
    Fan tray.

Pr_80_77_28_27 Fibre-optic patch panels

1. Description: The fibre patch panels shall be LC connector type patch panels./ Each cabinet shall be provided with a fibre patch panel.
2. Manufacturer: Submit proposals
3. Standard: To BS EN 50173-1.
4. Arrangement: 19 inch with pre-drilled rear gland holes with integral cable clamps and fixed tray.
5. Splice tray: One.
6. Height: 2 U.

7. Ports: 12.
8. Connector type: LC (Duplex).
9. Labelling: Engraved port number.

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_11/630 Installing cable basket in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/640 Installing cable supports on roofs 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_48/660 Installing low-voltage cables in conduit and trunking in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_72_97/610 Installing electrical accessories in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_70_75_88/620 Installing data and telecom transient overvoltage surge suppression devices

1. Standards: In accordance with BS 7671,as amended and PD CLC/TS 61643-22.
2. Point of installation: Within BMMS outstation.
   Within each Computer Room
3. Mounting arrangement: Separate enclosure.

Ss_75_10_21/625 Installing information technology cabling

1. System installer
   1.1. Registration: Corporate member of the Telecommunications Industry Association (TIA).
   Registered installer of the Fibreoptic Industry Association (FIA).
   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 hook and loop 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): 200 mm.
15. Balanced twisted pair cabling
    15.1. 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.
    6.3. Typography
        6.3.1. Font: Helvetica medium.
        6.3.2. Size: 10mm

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: Clear encapsulated card.
    3.3. Size: A4.
    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.
8. Format: To be confirmed by the School prior to installation

System completion

Ss_75_10_21/810 Testing and inspection of data distribution systems

1. Standards: In accordance with BS EN 50173-1.
2. Testing and inspection agent: Installation contractor
3. Notice before commencing tests (minimum): 72 hours.
4. Inspection of cabling: Inspect cables for kinks, bends, snags and compression and deformation damage.
5. Permanent link: Measure length of each cabling segment (connector to connector).
6. Pin assignment and continuity: Verify and submit results.
7. Cable temperature during testing: Submit.
8. Results: Submit in accordance with BS EN 50346, Annex A.
9. 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: Paper copy.
   - 2.4. Number of copies: Two.
3. Record drawings
   - 3.1. Content: For all data cabling, the cable origin, circuit designation, route, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
     General arrangement drawings.
     Cabling topology schematics.
     Distribution point layout drawings.
     Equipment room layout drawings.
     Interconnection diagrams.
   - 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: Adjacent to IT cabinet
   - 6.2. Format: Laminated A1 size paper print.
   - 6.3. Installation: Wall-mounted with cup and screw fixings.

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. Warrant operation with the following applications: Twisted pair physical medium development (TP-PMD).
   Future applications approved by ISO as being compatible with the installed system.
   PoE Type 4 Power over Ethernet).
   10GBase-T (10 gigabit Ethernet). CSMA/ CD 1000Base-T (gigabit Ethernet).
   1.2. Warranty period (minimum): 10 years

Ω End of System

Ss_75_40_02_11
Card access control systems

Systems

Ss_75_40_02_11 Card access control systems

1. Description: The contractor shall provide a new access control system for the areas as indicated on the drawings.

   The contractor shall engage JN Building Services to provide the complete new access control system.

   The new access control shall meet the requirements of the Trust access control specification.
2. System performance: Ss_75_40_02/210 Design of electronic access control systems; Ss_75_40_02/230 Connection to fire detection and alarm systems; Ss_75_40_02/228 Standby power supplies; Ss_75_40_02/240 Integration with other alarm and security systems
3. Registration: A Gold member of National Security Inspectorate.
4. System type: Networked.
5. Equipment interconnectivity: Wired.
6. Control software: Resident on the site server.
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. Door status monitoring: Pr_75_30_30_23 Door status monitoring devices
12. Cable type: Pr_65_70_15_53 Multicore alarm cables
13. Containment: Pr_65_70_11_17 Cable trays; Pr_65_70_11_71 Rigid conduit
14. Rewireable installation: Required.
15. Concealed installation: Required where possible
16. System accessories: Pr_70_75_15_11 Card printers
17. Execution: Ss_75_40_02/620 Installing electronic access control systems; Ss_75_40_02/630 Equipment labelling and diagrams for electronic access control systems
18. System completion: Ss_75_40_02/810 Testing and commissioning electronic access control systems; Ss_75_40_02/820 Documentation for electronic access control systems; Ss_75_40_02/830 Spares and consumables for electronic access control systems; Ss_75_40_02/840 Maintenance for electronic access control systems

System performance

Ss_75_40_02/210 Design of electronic access control systems

1. Design: The contractor shall engage JN Building Services to complete the design of the electronic access control system, including all the required interconnection between the wired and the wireless access control components.
2. Requirement: Submit proposals, including detailed design drawings, technical information, calculations and manufacturers' literature.
3. Standards: BS EN 60839-11-1 and BS EN 60839-11-2.
4. Spare capacity: The system shall be designed and installed to allow for a minimum of 20% future growth without the need to provide any additional equipment.
5. Database

5.1. Backup arrangements: Automatic.

6. Operation in the event of mains failure: Access points open.

Ss_75_40_02/228 Standby power supplies

1. Standby capacity (minimum): Continue to operate in the event of a failure of the primary power source for a minimum period of four hours.

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_02/240 Integration with other alarm and security systems

1. Objectives: The access control system shall be linked to the intruder alarm system to provide door status monitoring and alarm notification in the event of a door being opened whilst the intruder alarm is set.
   The access control shall be linked to provide system status including fault notification to the BMS.
2. Systems to be integrated: Intruder detection and alarm systems. Fire detection and alarm systems. Building monitoring and management systems.

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_11_71 Rigid conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_65_70_15_53 Multicore alarm cables

1. Description: The contractor shall supply and install all required cables to provide a complete and functioning system. The system cabling requirements shall be determined by JN Building Services as part of there system design.
2. Manufacturer: Submit proposals
3. Standard: To BS 4737-3-30.
4. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
5. Cable type: All cabling shall be LSZH and determined by JN Building Services
6. Conductor
   6.1. Number of cores: To be determined by JN Building Services
   6.2. Type: To be determined by JN Building Services
   6.3. Size: To be determined by JN Building Services
   6.4. Sheath: To be determined by JN Building Services
   6.5. Colour: To be determined by JN Building Services
   6.6. Screen: To be determined by JN Building Services
7. Reaction to fire class
   7.1. Fire behaviour: A_{ca}.
   7.2. Additional classification for smoke production: s1.
   7.3. Additional classification for flaming droplets and/ or particles: d0.

Pr_70_75_15_11 Card printers

1. Description: The contractor shall allow to provide a new card printer as part of the central onsite system.
2. Manufacturer: Submit proposals
3. Format: Single-sided.
4. Print

4.1. Method: Colour dye sublimation.
4.2. Resolution: 300 dpi.
4.3. Operation: Single-sided.
4.4. Speed (minimum): 60 cards/ hour.
5. Card feeder capacity: 50.

Pr_75_30_27_50 Magnetic locks

1. Description: Provide every networked access controlled door with a low voltage electromagnetic lock to match the fire integrity of the door rating and to effectively secure and release the door.
Ensure that the locks engage automatically when returned to the closed position.
Arrange that central annunciation of forced, door held open, or token misuse conditions occur within two seconds, irrespective of other system activities.
Agree the style and colour of all electronic locks and fixtures with the Architect prior to purchasing.
2. Manufacturer: Paxton
3. Standard: To BS EN 13637, when used on escape routes.
4. Rated operational voltage (Ue): To be determined by JN Building Services
5. Operation in the event of mains failure: Fail unlocked.
6. Holding force (minimum): 400 N
7. Monitoring: Micro-switch. Individual LEDs indicating door secure and door unlocked.
8. Features: Anti-tamper.
9. Material and finish: Brushed aluminium.
10. Instant release circuit: Required.
11. Operating temperature range: 0°C to 50°C.
12. Execution: Pr_75_30_27/640 Installing electric locks

Pr_75_30_30_03 Access control units

1. Description: The contractor shall provide access control units as required to provide a fully operational system. All access control units shall be positioned in secure areas.
The final positions shall be provided on the installation drawings for comment.
2. Manufacturer: Paxton
3. Standards: To BS EN 60839-11-1 and BS EN 60839-11-2.
4. Type of operation: Networked.
5. Number of doors per controller: Maximum of Three
6. Communication interface: Ethernet.
7. Visual indication: Status LEDs.
8. Interfaces
8.1. Door lock relays: Required, number to be confirmed by JN Building Services
8.2. Door status monitoring: Required, number to be confirmed by JN Building Services
8.3. Readers: Required, number to be confirmed by JN Building Services
8.4. Volt-free relays: Required, number to be confirmed by JN Building Services
8.5. Request-to-exit buttons: Required, number to be confirmed by JN Building Services
9. Battery backup
9.1. Battery location: Internal to controller.
9.2. Battery backup capacity: Four hours.
10. Administration access: Password-protected.
11. Incorporation of external data: Incorporate site layouts into system graphics.
Incorporate system symbols into system graphics.

12. Events and transactions: Data and time stamp.
13. Customized event alarms: Display.
14. Control features
    14.1. Include the following: Access point status monitoring.
    User-configurable access groups, grids and levels.
    User-configurable access point, unlock time.
    Daylight time saving.
    Display access point status on site and layout plans.
    Security lockdown.
    14.2. Anti-passback: Single access point.
    14.3. Time between credential presentation and door unlock (maximum): 0.3 seconds.
15. Reports
    15.1. Transaction and event reports: By access point.
    By area.
    By department.
    By time and date period.
    By user.
    15.2. Other reports: Staff time and attendance.
    Building occupancy.
16. Publishing: Export to PDF.
    Print.
17. Enclosure
    17.1. Material and finish: Steel.
    17.2. Colour: Black.
18. Execution: Pr_75_30_30/630 Installing access control units

Pr_75_30_30_23 Door status monitoring devices

1. Description: The contractor shall provide door status monitoring on all access controlled doors.
2. Device type: Magnetic reed switch.
3. Material: Aluminium.
4. Mounting: Recessed or Surface.

Pr_75_30_30_27 Emergency door release break glass units

1. Description: All access controlled doors provided with maglocks shall be provided with emergency break glass units on the secure side.
2. Manufacturer: Paxton
3. Frangible element: Resettable.
4. Test method: Key.
5. Protective cover: Required.
6. Monitoring
    6.1. Audible indication: Required.
    6.2. Visual indication: Required.
7. Colour: Green.
8. Labelling: 'EMERGENCY DOOR RELEASE'.
9. Mounting: Surface.
    Fully recessed.
10. 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. Description: The contractor shall provide card readers as indicated on the drawings. Generally these are for the doors which have maglocks on them.
2. Manufacturer: Paxton Access Ltd
3. Product reference:
4. Material and finish: Front: High gloss plastic; Frame: Plastic, RAL 9006 white.
5. Type: Flush-mounted.
   Surface-mounted.
6. Colour: RAL 9005 jet black.
7. RFID credentials: LEGIC (advant and prime), MIFARE (DESFire and Classic), OSS-SO Version 2017-10 (LEGIC advant, MIFARE DESFire).
8. Interfaces: RS-485: Connection to host; galvanically isolated, differential; Two binary inputs: 5 V d.c.(maximum); One relay output: 34 V d.c./60 W, 27 V a.c /60 VA (maximum).
9. Power supply: 10–34 V d.c.
10. Power consumption: Typical: 1.2 W; maximum: 2.2 W.
11. Temperature: -25 to +70°C.
12. HeatingRelativeHumidity: 0–95%, non-condensing.
13. Certification: EN 301 489-1, EN 301 489-3, EN 300 330-1, EN 300 330-2 and RED 2014/53/EU.
14. Ingress protection (IP) rating: IP54.
15. Execution: Pr_75_30_30/610 Installing keypads and readers

Pr_75_30_30_68 Proximity cards

1. Manufacturer: Paxton
2. Operating frequency: To be confirmed by JN Building Services to suit the access control system
3. Proximity read range: To be confirmed by JN Building Services to suit the access control system
4. Contactless cards
   4.1. Standard: Physical characteristics to BS ISO/IEC 14443-1.
   4.2. Material: ABS.
   4.3. Colour: White.
5. Printing capability: Suitable for inkjet printing.
   Suitable for single-sided dye-sublimation.
6. Programming: RF programmable.
7. Code: Unique to BS 7227.
8. Unique, visible identification number: Required.
9. Authentication: To be confirmed by Dormakaba to suit the access control system
10. Format: System manufacturer.
11. Manufacturer's guarantee against electronic failure (minimum): Required
12. Operating temperature range: -40°C to 70°C.
13. Accessories: Clear plastic holder with clip.

Pr_75_30_30_71 Request-to-exit buttons

1. Description: The contractor shall supply and install all required request to exit buttons as identified on the drawings.
2. Manufacturer: Paxton Access Ltd
3. Contact details

3.1. Address: Paxton House
Home Farm Road
Brighton
East Sussex
United Kingdom
BN1 9HU

3.2. Telephone: +44 (0)1273 811011

3.3. Web: https://www.paxton-access.com/specify-paxton/

4. Material and finish: Brushed aluminium.
5. Colour: Silver.
6. Mounting arrangement: Fully recessed.
Surface.
7. Engraving: 'NO-TOUCH EXIT'.
8. Operation: Passive infrared non-contact.
9. Illuminated button: Required.
10. Button characteristics: No-touch sensor area.
11. 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_11/640 Installing cable supports on roofs 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_11/700 Installing conduit, trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/710 Installing conduit generally in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/721 Installing rigid metallic conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_75_30_27/640 Installing electric locks

1. Location of components: Contractor to provide proposals as part of technical submission
2. Mounting arrangement: Surface.
3. Fire rating: Ensure that the installation of a lock does not compromise the integrity of a fire door.
4. Operation: Align door and frame-mounted components to provide a clean break during release – free egress should be provided with minimal effort. Ensure that locks do not restrict access through the door or cause an injury hazard.

Pr_75_30_30/610 Installing keypads and readers

1. Mounting

1.1. Mounting position: Install the reader on the wall within 200 mm of the latch edge of the door.

1.2. Mounting arrangement: Surface within plant and factory areas.
Recessed within the office and front of house areas.

1.3. Height (finished floor level to underside of equipment): 1100 mm.

2. Administration reader: Install adjacent to the access controller or PC administering the software to allow registration of users.

Pr_75_30_30/630 Installing access control units

1. Location of components: Contractor to provide proposals as part of technical submission
2. Mounting position: Ensure that controllers are fixed securely and allow clear access for cabling.

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

1. Location of components: Contractor to provide proposals as part of technical submission
2. Mounting position: Request-to-exit buttons to be mounted within 200 mm of the latch edge of the door.
   Emergency break glass units mounted adjacent on the side furthermost from the door.
3. Mounting arrangement: Surface on wall.
   Recessed into wall.
4. Height (finished floor level to underside of equipment): 900 mm.

Ss_75_40_02/620 Installing electronic access control systems

1. Standards: In accordance with National Security Inspectorate publication NCP: Code of Practice for design, installation and maintenance of access control systems.
2. Location of the access controller: Contractor to provide proposals as part of technical submission
3. Installing cabling
   3.1. Standard: In accordance with BS 7671.
   3.2. Security measures: Suitably protect all cabling from inadvertent damage or tampering to avoid compromising the security of the system.

Ss_75_40_02/630 Equipment labelling and diagrams for electronic access control systems

1. Access points and door controllers: Label with a unique identification code.
2. System diagram: Provide showing the location and identity of all system equipment.
3. Position: Next to the electronic access system controller.

System completion

Ss_75_40_02/810 Testing and commissioning electronic access control systems

1. Standards: To BS EN 60839-11-1 and BS EN 60839-11-2.
2. System commissioning agent: System manufacturer.
3. Notice before commencing tests (minimum): 14 d.
4. System programming: Configure user database and credentials.
   Configure time grids, zones and slots.
   Configure access permissions.
5. Cable testing
   5.1. Insulation resistance: Submit results.
   5.2. Earth continuity: Submit results.
6. Access points: Verify the correct operation of readers, across each access level. Check alignment of lock mechanism. Configure unlock times.

7. Standby supply: Verify operation in the event of a mains failure. Check capacity and submit results Verify operation of battery charger.
8. Equipment tamper detection: Verify operation.

Ss_75_40_02/820 Documentation for electronic access control systems

1. Standards: To 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.
     Paper copy.
   - 3.4. Number of copies: Two.
4. Record drawings
   - 4.1. Content: For all access control cabling, the cable origin, circuit designation, route from controller to access control point, conductor material and c.s.a., insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder.
     General arrangement drawings.
     Location of each access point, its associated controller and power supply.
   - 4.2. Format: Electronic drawing.
     A1 paper print drawing.
   - 4.3. Number of copies: Two.
5. Submittal date: At handover.

Ss_75_40_02/830 Spares and consumables for electronic access control systems

1. Credentials to be supplied: 250 of each type used.
2. Spares to be supplied
   - 2.1. Fuses: 10 x internal access control unit fuses.
   - 2.2. Frangible elements: 10 x emergency break glass elements.
   - 2.3. Printer ink cartridges: Three.

Ss_75_40_02/840 Maintenance for electronic access control systems

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

Ω End of System

Ss_75_40_53_86
Surveillance CCTV systems

Systems

Ss_75_40_53_86 Surveillance CCTV systems

1. Description: The contractor shall supply and install a new CCTV to cover the new STEPS area and the new SEND block.

   The contractor shall employ JN Building Services to carry out the detailed design, supply, install, test and commission of the new system.

   The system shall be fully compliant to the TSAT CCTV specification.
2. System performance: Ss_75_40_53/210 Design of surveillance CCTV systems; Ss_75_40_53/212 Operational requirements of surveillance CCTV systems; Ss_75_40_53/250 Integration of surveillance CCTV with other alarm and security systems
3. System manufacturer: Submit proposals
4. Surveillance equipment: Pr_60_75_86_31 Internet protocol (IP) fixed dome cameras
5. Data storage: Pr_60_75_03_56 Network video recorders
6. Cable type: To be confirmed by JN Building Services
7. Containment: Pr_65_70_11_71 Rigid conduit; Pr_65_70_11_12 Cable baskets
8. Rewireable installation: Required.
9. System accessories: Pr_40_10_57_86 Surveillance system signs; Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices
10. Execution: Ss_75_40_53/620 Installing surveillance CCTV systems; Ss_75_40_53/700 Installing signage for surveillance CCTV systems
11. System completion: Ss_75_40_53/820 Documentation for surveillance CCTV systems; Ss_75_40_53/810 Testing and commissioning surveillance CCTV systems

System performance

Ss_75_40_53/210 Design of surveillance CCTV systems

1. Design: Complete the design of the surveillance CCTV system.
2. Standards: In accordance with BS 8418.
3. System type: Internet protocol (IP).
4. Requirement: Submit proposals, including positions of cameras (including field of view), detectors (including range and coverage), areas designated for parking, control rooms, power supplies and interconnections. Include technical information, calculations and manufacturers' literature.

Ss_75_40_53/212 Operational requirements of surveillance CCTV systems

1. Standard: In accordance with BS EN 62676-4.
2. Objectives: Provide CCTV coverage of the new STEPS entrance and internal
3. Image storage: All images to be retained for 28 days before being erased, except where they relate to criminal activity.

Ss_75_40_53/250 Integration of surveillance CCTV with other alarm and security systems

1. Objectives: The new CCTV shall fully integrate with the Trust's Milestone system. The contractor shall ensure that all required licenses are allowed for and full coordination with Thinking Technology.

2. Systems to be integrated: Milestone XProtect Expert

Products

Pr_40_10_57_86 Surveillance system signs

1. Description: Provide all required
2. Manufacturer: Contractor's choice
3. Format: Yellow background with black text and images.
4. Content: Warn individuals that they are entering premises or an area with CCTV surveillance. CCTV camera symbol. Describe the purpose of the CCTV system. Identify the organization responsible for operating the system and their contact details.

Pr_60_75_03_56 Network video recorders

1. Description: Provide all required additional network recorders to suit the new cameras being provided.
2. Manufacturer: Submit proposals
3. Video compression formats: H.265
4. Recording speed and resolution: 1280 x 720 @ 25fps
5. Digital watermarking: To be confirmed with Thinking Technology
6. Playback function: Fast-forward x2, x8, x16, x32.
7. Video search function: Event.
   Time and date.
8. Screen display
   8.1. Window arrangement: To be confirmed with Thinking Technology
   8.2. Display the following information: To be confirmed with Thinking Technology
9. Display resolution (minimum): To be confirmed with Thinking Technology
10. Storage media
    10.1. Type: Dual hard disk.
    10.2. Capacity: To be confirmed with Thinking Technology
11. Network connectivity: 10/100 base T via RJ45.
12. Network protocols: To be confirmed with Thinking Technology
13. Video backup: To be confirmed with Thinking Technology
14. Telemetry protocol: To be confirmed with Thinking Technology
15. Power supply: 230 V a.c.
16. Mounting: Rack.
17. Execution: Pr_60_75_03/650 Installing video recorders

Pr_60_75_86_31 Internet protocol (IP) fixed dome cameras

1. Description: Provide Dome cameras to provide suitable coverage of the area
2. Manufacturer: Submit proposals
3. Spectrum: Colour.
4. Resolution (minimum): 640 x 480.
5. Integrated illumination: Infrared.
6. Camera functions
   6.1. Focus: Automatic.
   6.2. Shutter: Automatic.
   6.3. Signal-to-noise ratio (minimum): 50 dB with automatic gain control off.

6.4. Automatic gain control: Automatic.
6.5. White balance control: Automatic.
6.6. Backlight compensation: Required.
6.7. Wide dynamic range: On/ off/ automatic.
6.8. Day/ night mode switching: Automatic at predetermined threshold (25 lx).

7. Lens
   7.1. Format: Fixed focal length.
   7.2. Iris: Automatic, video drive.
8. Video motion detection: Required.
9. Power supply: PoE
10. Network connectivity: RJ-45 (10/100/1000 Base-T)
11. Video compression formats: H.265
12. Video streaming: 3
13. Camera housing
    13.1. Ingress protection (minimum): To BS EN 60529, IP66.
    13.2. Housing colour: White.
    13.3. Dome colour: Transparent.
14. Accessories: Wall bracket.
    Ceiling bracket.
15. Execution: Pr_60_75_86/610 Installing surveillance cameras

See Pr_65_70_11_12 Cable baskets in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_70_75_88_21 Data and telecom transient overvoltage surge suppression devices in Ss_75_10_21_21 Data distribution systems

Execution

Pr_60_75_03/650 Installing video recorders

1. Security: Protect from interference by unauthorized individuals.
2. Digital video recorder data and video connections: Complete.

Pr_60_75_86/610 Installing surveillance cameras

1. Siting: Cameras must be sited in such a way that they only monitor those spaces which are intended to be covered. If cameras are adjustable by the operators, the cameras must be restricted so that they cannot be adjusted to overlook spaces that are not intended to be covered by the scheme, e.g. an individual's private property. If such restriction is not possible, then operators must be trained in recognizing the privacy implications of such spaces being covered. To preserve personal privacy, some software systems can apply a digital 'mask' to the images, which blanks out all views apart from the intended targets.
2. Fixing equipment
   2.1. Generally: Fix independently of wiring installation with zinc electroplated fasteners.
   2.2. Orientation: Accurate and square to vertical and horizontal axes.
3. Final connection: Contain within PVC-covered metal flexible conduit.

See Pr_65_70_11/630 Installing cable basket 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_11/700 Installing conduit, trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/710 Installing conduit generally in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/721 Installing rigid metallic conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_70_75_88/620 Installing data and telecom transient overvoltage surge suppression devices in Ss_75_10_21_21 Data distribution systems

Ss_75_40_53/620 Installing surveillance CCTV systems

1. Standard: In accordance with BS 8418.
2. Site survey: Assess the site conditions and available artificial light.
3. Access: Locate system to provide safe access for maintenance and testing.

Ss_75_40_53/700 Installing signage for surveillance CCTV systems

1. Position: To be confirmed on site by JN Building Services

System completion

Ss_75_40_53/810 Testing and commissioning surveillance CCTV systems

1. Standard: To BS EN 62676-4.
2. System commissioning agent: JN Building Services
3. Cable testing
   3.1. Insulation resistance: Submit results.
   3.2. Earth continuity: Submit results.
4. Camera coverage: Adjust to obtain optimal performance with normal and infrared illumination.
5. Infrared illuminators: Accurately adjust to suit angle of associated cameras.
6. Pan-and-tilt units: Check accuracy of preset positions and demonstrate movement covers whole of relevant surveillance area.
7. Alarm and motion detection devices: Verify the operation, and adjust to provide maximum coverage.
8. Image storage time: Confirm.
9. Live and recorded images: Demonstrate from each camera and provide digital copies for reference purposes.

Ss_75_40_53/820 Documentation for surveillance CCTV systems

1. Standard: In accordance with BS EN 62676-1-1.
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: Paper copy.
Electronic

2.4. Number of copies: Two.

3. Secure recording area logbook: Hardback cover embossed 'CCTV LOGBOOK' with A4 lined paper, minimum 100 pages.

4. Record drawings

4.1. Content: General arrangement drawings showing the location of all control equipment, including receivers, transmitters, recorders, cameras, monitors, and associated power supply.

4.2. Format: A1 paper print drawing. Electronic drawing.

4.3. Number of copies: Two.

5. Submittal date: At handover.

Ω End of System

Ss_75_40_75_40
Intrusion and hold-up alarm systems

Systems

Ss_75_40_75_40 Intrusion and hold-up alarm systems

1. Description: The contractor shall supply and install a new intruder alarm system within the new SEND block.

   The contractor shall employ JN Building Services to carry out the detailed design, supply, install, test and commission of the new system.

   The system shall be fully compliant to the TSAT security specification.
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
3. System manufacturer: Contractor's choice
4. Control and indicating equipment (CIE): Provide a new keypad to serve the new SEND block.
5. Detectors: Pr_75_80_42_16 Combined passive infrared and microwave movement detectors
6. Cable type: To be confirmed by JN Building Services
7. Rewireable installation: Required.
8. Concealed installation: Required.
9. Execution: Ss_75_40_75/620 Installing intrusion and hold-up alarm systems
10. System completion: Ss_75_40_75/810 Testing and commissioning intrusion and hold-up alarms systems; Ss_75_40_75/820 Documentation for intrusion and hold-up alarm systems

System performance

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

1. Design: Complete the design of the intruder alarm system.
2. Standard: In accordance with PD 6662.
3. Security grading: To BS EN 50131-1, Grade 2.
4. Environmental classification: To BS EN 50131-1, Class I.
5. Confirmation of alarm condition
   5.1. Standard: In accordance with BS 8243.
6. 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: Keypad to be provided within first office of new SEND block.
   1.2. Exit: To be set via the same keypad within the office

Products

Pr_75_80_42_16 Combined passive infrared and microwave movement detectors

1. Description: Provide new Duel tech Detectors to cover the new SEND block
2. Manufacturer: Contractor's choice
3. Standard: To BS EN 50131-2-4.

4. Security grading: To BS EN 50131-1, Grade 2.
5. Environmental classification: To BS EN 50131-1, Class I.
6. Mounting: Wall.
7. Execution: Pr_75_80_42/630 Installing combined passive infrared and microwave movement detectors

Execution

Pr_75_80_42/630 Installing combined passive infrared and microwave movement detectors

1. Mounting: Surface-mounted.
2. Height (finished floor level to underside of equipment): 2600

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: JN Building Services
3. Cable testing
   3.1. Insulation resistance: Submit results.
   3.2. Earth continuity: Submit results.
4. Charger: Verify operation.
5. Detection devices: Verify the operation, and adjust to provide maximum coverage.
6. Device voltage: Submit details of the voltage at powered devices.
7. Local warning devices: Verify operation.
8. Remote signalling: Verify operation.
9. Standby supply: Verify operation in the event of a mains failure. Check capacity and submit results.
10. Tamper detection: Verify operation.
11. Timers: Set up and adjust entry and exit timers.
12. User codes: Set up and commission.

Ss_75_40_75/820 Documentation for intrusion and hold-up alarm systems

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: Paper copy.
   2.4. Number of copies: Two.
3. Logbook: Hardback cover embossed 'INTRUSION 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.
   5.2. Format: Electronic drawing.
   A1 paper print drawing.
   5.3. Number of copies: Two.
6. Submittal date: At handover.

Ω End of System

Ss_75_50_11_25
Emergency assistance call systems

Systems

Ss_75_50_11_25 Emergency assistance call systems

1. Description: The contractor shall supply, install, test and commission a assistance call system to the accessible WCs.
2. System performance: Ss_75_50_11/210 Design of emergency assistance call systems
3. System manufacturer: Contractor's choice
4. Operating voltage: 12 V d.c.
5. Control and indicating equipment: Pr_75_75_04_25 Emergency assistance call indicator units; Pr_75_75_04_26 Emergency call power supply units; Pr_75_75_04_29 Emergency assistance call reset units; Pr_75_75_04_28 Emergency assistance call pull cord units
6. Containment: Pr_65_70_11_71 Rigid conduit
7. Containment accessories: Pr_65_70_11_20 Conduit fittings
8. Rewireable installation: Required.
9. Concealed installation: Required.
10. Execution: Ss_75_50_11/630 Installing emergency assistance call systems
11. System completion: Ss_75_50_11/842 Maintenance of emergency assistance call systems; Ss_75_50_11/832 Spares and consumables for emergency assistance call systems; Ss_75_50_11/830 Documentation for emergency assistance call systems; Ss_75_50_11/812 Testing and commissioning emergency assistance call systems

System performance

Ss_75_50_11/210 Design of emergency assistance call systems

1. Design: Complete the design of the emergency assistance call system.
2. Standard: In accordance with BS 7671.
3. Proposals: Submit detailed design drawings, technical information, calculations and manufacturers' literature.

Products

See Pr_65_70_11_20 Conduit fittings in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_75_75_04_25 Emergency assistance call indicator units

1. Description: The contractor shall supply and install indicator units above the door to the space.
2. Manufacturer: Contractor's choice
3. Standards: In accordance with BS 8300-2.
4. Mounting type: Flush.
5. Visual indicator: Blue LED.
6. Integral buzzer: Required.
7. Execution: Pr_75_75_04/650 Installing emergency assistance call indicator units

Pr_75_75_04_26 Emergency call power supply units

1. Description: The contractor shall supply and install power supply units for each of the assistance call systems local to the room which its serves.
2. Manufacturer: Contractor's choice
3. Standards: To BS EN 54-4 and in accordance with BS 5839-9.
   To BS EN IEC 62368-1.
4. Integral replaceable fuse: Required.
5. Power-on indicator: Required.
6. Enclosure
   6.1. Mounting type: Surface.
   6.2. Material: Stainless steel.
   6.3. Finish: Powder-coated.
   6.4. Colour: White.
   6.5. Security: Lockable cover.
7. Features: Auxiliary relays with normally open and normally closed contacts.
8. Execution: Pr_75_75_04/680 Installing emergency call power supply units

Pr_75_75_04_28 Emergency assistance call pull cord units

1. Description: The contractor shall supply and install pull cords with each space as identified on the drawings.
2. Manufacturer: Contractor's choice
3. Standards: In accordance with BS 8300-2.
4. Mounting type: Surface.
5. Colour: White.
6. Cord
   6.1. Material: Nylon.
   6.2. Colour: Red.
   6.3. Pull handles: Two.
   6.4. Length: Sufficient to reach finished floor level.
7. Audible indication: Integral alarm.
8. Visual indication: Integral reassurance LED.
9. Ingress protection (minimum): To BS EN 60529, IP30.
10. Execution: Pr_75_75_04/610 Installing emergency assistance call pull cord units

Pr_75_75_04_29 Emergency assistance call reset units

1. Description: The contractor shall supply each room with a reset unit which will reset the alarm within that room.
2. Manufacturer: Contractor's choice
3. Standards: In accordance with BS 8300-2.
4. Mounting type: Recessed.
5. Colour: White.
6. Ingress protection (minimum): To BS EN 60529, IP65.
7. Audible indication: Required.
8. Visual indication: Integral reassurance LED.
9. Features: Braille text indication 'RESET'.
   Engraved 'RESET' legend.

10. Execution: Pr_75_75_04/670 Installing emergency assistance call reset units

Execution

See Pr_65_70_11/700 Installing conduit, trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/710 Installing conduit generally in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/721 Installing rigid metallic conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_75_75_04/610 Installing emergency assistance call pull cord units

1. Mounting arrangement: Ceiling.
2. Position within room: Within reach of persons using the toilet. Within reach of persons using the changing accommodation.
3. Pull handles: Set so that the lower handle is at 100 mm and the upper handle is between 800–1000 mm above finished floor level.

Pr_75_75_04/650 Installing emergency assistance call indicator units

1. Position: As indicated on the drawings
2. Mounting arrangement: On wall, midway between door top and underside of ceiling.

Pr_75_75_04/670 Installing emergency assistance call reset units

1. Position: As indicated on the drawing
2. Mounting arrangement: Within reach of persons in a wheelchair. Within reach of persons using the toilet. Within reach of persons using the changing accommodation.
3. Mounting height: 900 mm above finished floor level.

Pr_75_75_04/680 Installing emergency call power supply units

1. Position: As indicated on the drawings
2. Final connection
   2.1. Accessory type: Unswitched fused connection unit

Ss_75_50_11/630 Installing emergency assistance call systems

1. Standard: In accordance with BS 7671.

System completion

Ss_75_50_11/812 Testing and commissioning emergency assistance call systems

1. Standard: In accordance with BS 7671.
2. Notice before commencing commissioning: Seven days.
3. System commissioning agent: Contractor
4. Controls: Verify operation.
5. Alarm signalling: Verify operation.
6. Results: Submit
7. Certificates of calibration for meters and instruments: Submit.

Ss_75_50_11/830 Documentation for emergency assistance call 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.
   Paper copy.
   1.4. Number of copies: Two.
2. Record drawings
   2.1. Content: General arrangement drawings showing the location of all power supply units to actuators, reset units, and visual alarm signal devices.
   Schematic diagram showing all control cabling, the cable origin, route from power supply units to actuators, reset units, 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: A1 paper print drawing.
   Electronic drawing.
   2.3. Number of copies: Two.
3. Submittal date: At handover.

Ss_75_50_11/832 Spares and consumables for emergency assistance call systems

1. Supply the following spares: Emergency assistance call pull cord units.
   Emergency assistance call indicator units.
   Emergency assistance call reset units.

Ss_75_50_11/842 Maintenance of emergency assistance call systems

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

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: Provide a fully automatic fire detection and alarm system to satisfy the area coverage, and operational and performance criteria as detailed in this specification.

   Within the STEPS area the existing loop shall be modified and devices added/ removed as indicated on the drawings.

   The new SEND building shall be provided with a new 2 loop Advanced fire alarm panel networked back to the existing site wide system.
2. System performance: Ss_75_50_28/230 Performance of fire detection and alarm systems; Ss_75_50_28/245 Detection zones; Ss_75_50_28/250 Alarm zones; Ss_75_50_28/258 Electrical actuation of release mechanisms for doors; Ss_75_50_28/285 Automatic transmission of alarm signals
3. System Installer: JN Building Services shall be employed to carry out all works on the fire alarm system.
4. System type: Addressable.
5. Detection devices
   5.1. Atmosphere: Normal.
   5.2. Types: Pr_75_80_30_65 Point smoke detectors; Pr_75_80_30_50 Manual call points
6. Equipment interconnectivity: Pr_65_70_48_29 Fire-resistant screened low-smoke halogen-free (LSHF) cables
7. Cable containment: Pr_65_70_11_12 Cable baskets; Pr_65_70_11_71 Rigid conduit
8. Rewireable installation: Required.
9. Concealed installation: Required as far as possible
10. Internal alarms
    10.1. Primary: Pr_75_80_30_30 Fire alarm sounders
11. External alarms: New system within SEND building to be linked back as part of site wide system.
12. Controls: Pr_75_80_30_29 Fire alarm panels; Pr_75_80_30_28 Fire alarm input and output modules
13. System accessories: Pr_40_10_57_33 Fire zone diagrams
14. Execution: Ss_75_50_28/605 Removing fire detection and alarm systems; Ss_75_50_28/615 Modifying existing fire detection and alarm systems; Ss_75_50_28/630 Installing cabling for fire detection and alarm systems; Ss_75_50_28/610 Installing fire detection and alarm systems; Ss_75_50_28/695 Installing interfaces to ancillary systems and equipment
15. System completion: Ss_75_50_28/805 System information; Ss_75_50_28/806 Device identification and 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; Ss_75_50_28/819 Testing and commissioning interfaces to ancillary systems and equipment; Ss_75_50_28/845 Modifications to existing fire detection and alarm systems; Ss_75_50_28/820 Documentation for fire detection and alarm systems; Ss_75_50_28/829 Documentation for interfaces to ancillary systems and equipment; Ss_75_50_28/850 Verification certificate for fire detection and alarm systems; Ss_75_50_28/860 Acceptance certificate for fire detection and alarm systems; Ss_75_50_28/895 Verification on completion

System performance

Ss_75_50_28/230 Performance of fire detection and alarm systems

1. Spare system capacity: 20% minimum
2. Number of devices per zone (maximum): 80
3. Verification: Provide full verification on the modified loop within the STEPS area.

Ss_75_50_28/245 Detection zones

1. Zoning: The SEND building will be a single zone.
   The STEPS area will maintain the existing zoning.

Ss_75_50_28/250 Alarm zones

1. Alarm zoning: To match existing

Ss_75_50_28/258 Electrical actuation of release mechanisms for doors

1. System designer: System manufacturer
2. Standard: In accordance with BS 7273-4.
3. Category: As per Architects information
4. Actuation method: Electrically powered hold-open devices to be actuated by an acoustic signal from the building's fire alarm sounders.

   Connect the power supply via an input/ output unit connected to the fire detection circuit of the addressable fire detection and fire alarm system.

Ss_75_50_28/285 Automatic transmission of alarm signals

1. Means of signal transmission
   1.1. Primary: The new panel within the SEND building will be linked to the existing site wide system and notify the main fire alarm panel within the main school building as the primary notification. The main fire alarm panel shall then work as the existing Cause & Effect.
2. Transmission path monitoring: Required.
3. Signals to be transmitted to ARC: As Existing

Products

Pr_40_10_57_33 Fire zone diagrams

1. Description: JN Building services shall allow to update all zone charts within the whole school as required to suit the modifications to the fire alarm system.
2. Verification
   2.1. Submittals: Submit Proposals
   2.2. Timing: At Handover

See Pr_65_70_11_12 Cable baskets in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11_71 Rigid conduit in Ss_70_30_80_35 Hardwired low-voltage small power systems

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

1. Description: Supply and install FP200 enhanced cabling for the fire alarm loop cabling. All cabling shall be supplied and installed in accordance with manufacturer recommendations. All cabling shall be adequately supported using metallic fixings.

2. Manufacturer: Contractor's choice
3. Standard: To BS 7629-1.
4. Third-party certification: British Approvals Service for Cables (BASEC)-certified.
5. Size: minimum 1.5mm
6. Fire resistance category: STANDARD 60. ENHANCED 120.
7. Execution: Pr_65_70_48/635 Installing low-voltage cables; Pr_65_70_48/660 Installing low-voltage cables in conduit and trunking

Pr_75_80_30_28 Fire alarm input and output modules

1. Description: Provide interface units of the addressable type connected to the local loop circuit and which provide the required inputs and outputs for control or indication functions.

   Ensure each input/output way is fully programmable from the control panel and fully monitored for open and short circuit conditions.
2. Manufacturer: Apollo Devices
3. Standards: To BS EN 54-17. To BS EN 54-18.
4. Third-party certification: LPCB-approved.
5. Device type: Single input module. Dual input module. Single output module.
6. Mounting arrangement: Suitable for mounting within fire detection and alarm control and indicating equipment (CIE) .
7. Enclosure
   7.1. Ingress protection (minimum): To BS EN 60529, IP 54.
   7.2. Material: ABS plastics.
   7.3. Colour: White.

Pr_75_80_30_29 Fire alarm panels

1. Description: The contractor shall supply, install, test and commission the new fire alarm system for the building.

   The panel shall be provided with all necessary controls and indication to monitor, interrogate, programme, silence, test and re-set the system. Include facilities for full fault monitoring of all devices connected to the loop. Incorporate zone/address designation LED indicator boards, complete with full operating instructions and facility to enter all zone and address allocations. Ensure the panel is to be capable of indicating the exact source of the alarm condition on the display. Provide an integrated microprocessor system to interpret, analyse and dispense fire alarm information. Provide a non-volatile memory to record all system events, up to a maximum of 5000 events, and hold these available for printing out or displaying on screen. The time and date of each event is to be recorded, with sufficient data to identify the device, zone and loop. The earliest event is to be automatically discarded on memory overrun.
2. Manufacturer: Advanced Electronics Ltd
3. Standard: To BS EN 54-2.
4. Third-party certification: LPCB-approved.
5. Standby power supply
   5.1. Standard: To BS EN 54-4.
   5.2. Capacity: 72 hours
6. Main display: Manufacturers standard
7. Zone indication: Individual LED status indicators.
8. Installed capacity: Two loops.
9. Printer: Not required.
10. Controls: Test condition facilities.

11. Outputs: Standardized input and output interface.
12. Input device: Qwerty keyboard.
13. Features: Automatic device address setup via control and indicating equipment (CIE).
14. Enclosure
    14.1. Ingress protection (minimum): IP30
    14.2. Material: Steel.
    14.3. Finish: Powder-coated.
    14.4. Colour: Grey.
    14.5. Mounting: Surface.
15. Execution: Pr_75_80_30/610 Installing main control and indicating equipment (CIE)

Pr_75_80_30_30 Fire alarm sounders

1. Description: Sounders are to be electronic, with an output frequency of 500-1000Hz, providing a sound level of not less than 104 dBA at 1 metre and to have adjustable volume control.

   The contractor shall ensure that the number of sounders on any one circuit does not exceed the manufacturer's recommended maximum.
2. Manufacturer: Apollo Fire Detectors Ltd
3. Standard: To BS EN 54-3. To BS EN 54-17. To BS EN 54-23.
4. Third-party certification: LPCB-approved.
5. Sounder type: Electronic sounder.
6. Rated voltage: 24 V d.c.
7. Sound patterns: In accordance with BS 5839-1.
8. Enclosure protection: To BS EN 54-3, Type A.
9. Sound pressure level (minimum): 65 dBA at 1 m.
10. Integral beacon: To BS EN 54-23, C-x-y. To BS EN 54-23, W-x-y.
11. Mounting: Surface.
12. Power supply: From loop.
13. Execution: Pr_75_80_30/640 Installing sounders

Pr_75_80_30_50 Manual call points

1. Description: Provide manual call points of the addressable type complying fully with BS EN 54-11, made of polycarbonate/moulded ABS material and finished in red. Ensure all manual call points are of the same type. Install call points complete with suitable inscription of operation, and provided with suitable proprietary enclosures for surface or flush mounting and internal/external locations.
2. Manufacturer: Apollo Fire Detectors Ltd
3. Standard: To BS EN 54-11.
4. Third-party certification: LPCB-approved.
5. Designation: Type A.
6. Frangible element: Resettable.
7. Integral red visual indicator: Required.
8. Environmental category: Indoor.
9. Mounting: Surface.
10. Protective covers: Required.
11. Execution: Pr_75_80_30/630 Installing manual call points

Pr_75_80_30_65 Point smoke detectors

1. Description: Provide smoke sensors of the electronic type and specifically designed for analogue operation and capable of being utilised for either rate of rise or fixed high temperature heat detection.

   Ensure the detector complies with the sensitivity performance of BS EN 54 and is capable of sensitivity adjustment via the system control panel.

   Ensure the detector parameters for fixed temperature operation, rate of change temperature operation, ambient temperature and grade of response are as indicated on the drawings.
2. Manufacturer: Apollo Fire Detectors Ltd
3. Standard: To BS EN 54-7.
4. Third-party certification: LPCB-approved.
5. Detector type: Optical.
6. Power source: Loop
7. Execution: Pr_75_50_76/620 Installing point detectors

Execution

See Pr_65_70_11/630 Installing cable basket 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_11/700 Installing conduit, trunking and ducting in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/710 Installing conduit generally in Ss_70_30_80_35 Hardwired low-voltage small power systems

See Pr_65_70_11/721 Installing rigid metallic conduit 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_48/660 Installing low-voltage cables in conduit and trunking in Ss_70_30_80_35 Hardwired low-voltage small power systems

Pr_75_50_76/620 Installing point detectors

1. Position: Provide point detectors as indicated on the drawings

Pr_75_80_30/610 Installing main control and indicating equipment (CIE)

1. Position: As indicated on the SEND drawing
2. Power supply: Derive from a dedicated circuit from the local distribution board serving the new SEND area and connect to CIE via unswitched fused connection units.

Pr_75_80_30/630 Installing manual call points

1. Position: Provide manual call points as indicated on the drawing
2. Mounting height: 1.2 m.
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.
5. Protective covers: Required

Pr_75_80_30/640 Installing sounders

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

Ss_75_50_28/605 Removing fire detection and alarm systems

1. Scope: Remove the devices within the STEPS area to allow the works to be undertaken. Exact devices to be isolated and removed to be identified and confirmed by JN Building Services.

Ss_75_50_28/610 Installing fire detection and alarm systems

1. Standard: In accordance with BS 5839-1.

Ss_75_50_28/615 Modifying existing fire detection and alarm systems

1. Connections to external and remote signalling devices: As existing with JN Building Services carrying out all works on the fire alarm and working in connection with the school.
2. Circuits and cabling that are to remain: Employ JN Building Services to modify the fire alarm to suit the works within the STEPS area.
3. Method: Submit proposals.

Ss_75_50_28/630 Installing cabling for fire detection and alarm systems

1. Standard: In accordance with BS 7671.
2. Cable route: Segregate from other cabling. Where installed in trunking, locate in a dedicated fire cabling compartment.
3. Cable topology: Loop circuits without spurs or tees.
4. Cable pulling: Submit proposals.
5. Timing: Do not start internal cabling until building enclosure provides permanently dry conditions.
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 and terminal fittings only.
9. Maximum circuit resistance: Measure before concealment. Submit results.

Ss_75_50_28/695 Installing interfaces to ancillary systems and equipment

1. Connection to equipment: Install interconnecting wiring between interface unit and equipment controlled.
2. Interface units: Label, describing their function.

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_28/808 System soak testing

1. Soak test: Undertake when construction works are complete, but before handover.
2. Period: Seven days.
3. Retest after remedial works: Required.

Ss_75_50_28/809 Measurement of sound pressure levels

1. Sound pressure levels: Measure throughout the building during worst case building operation with all doors shut.
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

1. System commissioning agent: To be undertaken by JN Building Services
2. Standard: In accordance with BS 5839-1.

Ss_75_50_28/819 Testing and commissioning interfaces to ancillary systems and equipment

1. System commissioning agent: JN Building Services
2. Standard: In accordance with BS 7273-6.
3. Connections with other systems and equipment: Verify and demonstrate operation of the systems and equipment under fire and fault conditions.

Ss_75_50_28/820 Documentation for fire detection and alarm systems

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: Electronic.
   Paper copy.
   2.4. Number of copies: Two.
3. Record drawings
   3.1. 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.

3.2. Drawing format: A1 paper print drawing.
Electronic drawing.

3.3. Number of copies: Two.

3.4. Submittal date: At handover.

4. Fire evacuation plan: Update existing site plan following the works.

5. Certification

5.1. Design certificate: Submit two copies in accordance with BS 5839-1, annex G.1.

5.2. Installation certificate: Submit two copies in accordance with BS 5839-1, annex G.2.

5.3. Commissioning certificate: Submit two copies in accordance with BS 5839-1, annex G.3.

Ss_75_50_28/829 Documentation for interfaces to ancillary systems and equipment

1. Certification: Submit in accordance with BS 7273-6, annex B.

Ss_75_50_28/845 Modifications to existing fire detection and alarm systems

1. Modification certificate: Submit two copies in accordance with BS 5839-1, annex G.7.

Ss_75_50_28/850 Verification certificate for fire detection and alarm systems

1. System verification agent: To be agreed as part of the testing and commissioning process
2. Verification certificate: Submit two copies in accordance with BS 5839-1, annex G.5.

Ss_75_50_28/860 Acceptance certificate for fire detection and alarm systems

1. Acceptance certificate: Submit two copies in accordance with BS 5839-1, annex G.4.

Ss_75_50_28/895 Verification on completion

1. Requirement: Submit two copies in accordance with BS 5839-1.

Ω End of System

Pr_65_54_95_83
Steel globe stop and check valves

Products

Pr_65_54_95_83 Steel globe stop and check valves

1. Description: Check valves shall be provided as detailed on the tender drawings, and as a minimum shall be installed downstream of pumps and upstream of electric water heaters.

   Check valves shall be the full size of the service pipe into which they are installed.
2. Manufacturer:
3. Standard: To BS EN 13709 and BS EN 16668.
4. Pattern:
5. Body ends:
6. DN rating:
7. PN rating:
8. Stem:
9. Operation:
10. Auxiliary connections designation:
11. Body tappings: Required.
12. Accessories:
13. Execution:
14. Verification
    14.1. Submittals:
    14.2. Timing:

Ω End of Product


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