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WIVELSFIELD VILLAGE HALL

EAST END EXTENSION

MECHANICAL SERVICES SPECIFICATION

VOLUME 3 – MECHANICAL TECHNICAL SPECIFICATION

INVESTORS IN PEOPLE

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WIVELSFIELD VILLAGE HALL
EAST END EXTENSION
MECHANICAL SERVICES SPECIFICATION
VOLUME 3 – MECHANICAL TECHNICAL SPECIFICATION

Client:	Project Site Address:
Gary Thompson Crowther Associates Architects Pelham House 25 Pelham Square Brighton BN1 4ET	Wivelsfield Village Hall Eastern Road Wivelsfield Green RH17 7QG

Prepared By:	
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Contents

50-10-05/120 Above ground wastewater drainage system with internal stacks

System outline

50-10-05/120 Above ground wastewater drainage system with internal stacks

- **Description**: The buildings waste water drainage system shall operate under gravity and be a single discharge stack system type.
  The new waste disposal installation shall serve the sinks, wash hand basins, WCs and all other sanitaryware and equipment required in the building.

  The system shall comprise trapped branch pipework extending the various sanitary fittings to connect to vertical soil and vent stacks and stub stacks, ventilated to atmosphere and discharging into the underground drainage system.

  Wherever possible all pipework shall be routed in concealed locations with appropriate access i.e. IPS systems and rodding eyes shall be provided for maintenance and repair. Where pipework is exposed it shall be installed to a high standard, true to line and gradient and with adequate support fittings.

  Typically main stacks terminate to atmosphere or where this is not possible through Air Admittance Valves (AAVs) in accordance with BS EN 12056.

  Access doors and rodding eyes are to be located in positions that are fully accessible, once the fit out is complete.

  Overflows shall discharge down suitably sized common overflow pipes via a tundish, trapped as necessary. All pipes shall be individually labelled with location origins.

  Long waste runs shall be avoided wherever possible. In unavoidable cases, antisyphon fittings are required on long waste runs.

  The contractor shall undertake the final design for the drainage system, its compliance to building regulations and the co-ordination with other mechanical, public health and electrical services.

- **System manufacturer**: Contractor's choice.
- **Floor drainage**:
  - **Preparation to existing floors**: Cutting out holes in existing concrete and Cutting out holes in existing timber floors.
  - **Supports**:
    Bedding: 45-55-50/303 Cement gauged prescribed mix mortar.
    Backfill: 45-55-50/303 Cement gauged prescribed mix mortar.
    Fixings: Included.
- **Sanitary pipework**:

  - **Small diameter branch discharge pipework**:
    Pipelines and fittings: 90-10-20/354 Unplasticized polyvinyl chloride (PVC-U) above ground drainage pipes.
    Accessories for jointing: 45-75-90/412 PTFE thread sealing tape.
    Supports: 90-10-20/340 Brackets and clips for above ground drainage pipes.
    Fixings: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
  - **Large diameter branch discharge pipework**:
    Pipelines and fittings: 90-10-20/348 High density polyethylene (HDPE) above ground drainage pipelines.
    Accessories for jointing: Mechanical Joint System.
    Supports: 90-10-20/340 Brackets and clips for above ground drainage pipes.
    Fixings: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
  - **Discharge stack pipework**:
    Pipelines and fittings: 90-10-20/348 High density polyethylene (HDPE) above ground drainage pipelines.
    Accessories for jointing: Mechanical Joint System.
    Supports: 90-10-20/340 Brackets and clips for above ground drainage pipes.
    Fixings: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
- **Ventilating pipework**:
  - **Ventilating branch pipework**:
    Pipelines and fittings: 90-10-20/354 Unplasticized polyvinyl chloride (PVC-U) above ground drainage pipes.
    Accessories for jointing: 45-75-90/412 PTFE thread sealing tape.
    Supports: 90-10-20/340 Brackets and clips for above ground drainage pipes.
    Fixings: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
  - **Ventilating stack pipework**:
    Pipelines and fittings: 90-10-20/354 Unplasticized polyvinyl chloride (PVC-U) above ground drainage pipes.
    Supports: 90-10-20/340 Brackets and clips for above ground drainage pipes.
    Fixings: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
- **Overflow pipework**:
  - **Pipelines and fittings**: 90-10-20/354 Unplasticized polyvinyl chloride (PVC-U) above ground drainage pipes.
  - **Accessories for jointing**: 45-75-90/412 PTFE thread sealing tape.
  - **Supports**: 90-10-20/340 Brackets and clips for above ground drainage pipes.
  - **Fixings**: 45-50-60/440 Wood screws and 45-50-67/350 Masonry plugs.
- **Pipework identification**: 90-90-55/430 Identifying pipework type A.
- **Fire stopping**:
  - **Floor penetrations**: 90-10-60/405 Pipe sleeves.
  - **Wall penetrations**: 90-10-60/405 Pipe sleeves.
- **System accessories**: Access fittings;
  90-10-90/400 Air admittance valves;
  and 90-10-60/437 Discharge and ventilating stack terminations.
- **Execution**: 50-10-05/622 Access to above ground wastewater drainage systems for testing and maintenance;
  50-10-05/614 Installing above ground wastewater drainage discharge branch pipework;

50-10-05/616 Installing above ground wastewater drainage discharge stack pipework generally;
and 50-10-05/610 Installing above ground wastewater drainage systems.

- **System completion**: 50-10-05/820 Above ground wastewater drainage system pipework airtightness test;
50-10-05/840 Above ground wastewater drainage system pre-handover checks;
50-10-05/830 Above ground wastewater drainage system siphonage and back pressure tests;
50-10-05/850 Above ground wastewater drainage system submittals;
50-10-05/860 Documentation;
and 50-10-05/810 Testing above ground wastewater drainage systems.

Products

45-50-60/440 Wood screws

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 14592.
- **Material**: Stainless steel.
- **Finish**: Galvanized.
- **Screw details**:
  - **Head option**: Countersunk head.
  - **Screw pattern**: Fully threaded shank.
- **Screw cups**: Required.
- **Execution**: 45-50-60/620 Fixing with screws.

45-50-67/350 Masonry plugs

- **Manufacturer**: Contractor's choice.
- **Format**: To suit substrate, loads to be supported and conditions expected in use.
- **Size**: Contractor's choice.

45-55-50/303 Cement gauged prescribed mix mortar

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 998-2.
- **Mortar type**: Manufacturer's standard.
- **Mix**: As drawings.
- **Admixture**: Styrene butadiene rubber (SBR).
- **Colour**: In accordance with Architect's details and specification.
- **Reaction to fire classification**: Class A1.
- **Additional requirements**: Durability: Freeze/ thaw resistance: Frost resistant
and Durability: Freeze/ thaw resistance: Suitable for exposed external use below dpc.
- **Execution**: 45-55-50/615 Height of lifts in brick and block walling using cement gauged mortar or hydraulic lime mortar.

45-75-90/412 PTFE thread sealing tape

- **Manufacturer**: Contractor's choice.
- **Standards**: To BS 7786.
- **Material**: Unsintered polytetrafluorethylene (PTFE) tape.
- **Thickness**: To suit application.
- **Width**: 12 mm.

90-10-20/340 Brackets and clips for above ground drainage pipes

- **Manufacturer**: Contractor's choice.
- **Pipe location**: Internal.
- **Arrangement**: Horizontal and Vertical.
- **Form**: Anchor and guide brackets for low gradient internal pipes and Pipe clips.

90-10-20/348 High density polyethylene (HDPE) above ground drainage pipelines

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 1519-1.
- **Third party product certification**: BBA Agrément certificate.
- **Recycled content**: Submit proposals.

90-10-20/354 Unplasticized polyvinyl chloride (PVC-U) above ground drainage pipes

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS 4514.
- **Third party product certification**: BSI Kitemark or Agrément certified.
- **Nominal sizes**: DN 32;
  DN 40;
  and DN 50.
- **Colour**: Grey.
- **Integral accessories**: Access fittings and Air admittance valves for stacks only.
- **Execution**:

90-10-60/405 Pipe sleeves

- **Material**: To match pipe material
- **Form**: The internal diameter of the sleeve shall be one or two pipe sizes greater than the pipe being served. Except where necessary to allow for expansion and contraction, the sleeve shall not exceed the outside diameter of the pipework enclosed by more than 20mm. The sleeve shall project a minimum of 5mm beyond the finished surfaces. Sleeves in a vertical position where washing down of floors is likely to be carried out shall project 50mm above the finished floor level.
- **Installation**: Do not use sleeves as pipe supports.

90-10-60/437 Discharge and ventilating stack terminations

- **Manufacturer**: Contractor's choice.
- **Arrangement**: Perforated cover or cage that does not restrict airflow.
- **Material**: Plastics, as discharge stack.

90-10-90/400 Air admittance valves

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 12380.
- **Third party certification**: BSI Kitemark certified.
- **Material**: PVC-U.
- **Size**: 50 mm and 110 mm.
- **Jointing**: Push fit.
- **Minimum air flow rate**: To BS EN 12056-2.
- **Execution**: 90-10-90/660 Installation of discharge connections.

90-90-55/430 Identifying pipework type A

Shared by: 50-10-05/120 Above ground wastewater drainage system with internal stacks; 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standards**: To BS 1710.
- **Identification type**: Adhesive colour bands.
- **Execution**: 90-90-55/660 Installing identification on pipework.

Execution

45-50-60/620 Fixing with screws

- **Clearance holes**: Required.
- **Fastener spacing**: Contractor's choice.
- **Finished level of screw heads**:
  - **Exposed**: Flush with surface.
  - **Concealed (holes filled or stopped)**: Sink minimum 2 mm below surface.

45-55-50/615 Height of lifts in brick and block walling using cement gauged mortar or hydraulic lime mortar

- **Quoins and advance works**: Rack back.
- **Lift height (maximum)**: 1.2 m above any other part of work at any time.
- **Daily lift height (maximum)**: 1.5 m for any one leaf.

50-10-05/610 Installing above ground wastewater drainage systems

- **Standards**: To BS EN 12056-2 and BS EN 12056-5.
- **Collection and distribution of wastewater**:
  - **General**: Quick, quiet and complete; self-cleansing in normal use, without blockage, crossflow, backfall, leakage, odours, noise nuisance or risk to health.
  - **Pressure fluctuations in pipework (maximum)**: ±38 mm water gauge.
  - **Water seal retained in traps (minimum)**: 25 mm.
- **Pipelines**: Plumb and/ or true to line.
  - **Routes**:

    Routes generally: The shortest practical, with as few bends as possible.

    Routes not shown on drawings: Submit proposals.
  - **Jointing**: Joint with materials, fittings and techniques intended for the purpose and that will make effective and durable connections.
- **Allowance for thermal and building movement**: Provide and maintain clearance as fixing and jointing proceeds.
- **Concealed or inaccessible surfaces**: Decorate before starting work specified in clauses from this section.
- **Electrolytic corrosion**: Avoid contact between dissimilar metals where corrosion may occur.
- **Protection**:
  - **Purpose made temporary caps**: Fit to prevent ingress of debris.
  - **Access covers, cleaning eyes and blanking plates**: Fit as the work proceeds.

50-10-05/614 Installing above ground wastewater drainage discharge branch pipework

- **Pipework**:

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

50-10-05/616 Installing above ground wastewater drainage discharge stack pipework generally

- **Pipework**:
  - **Alignment**: Fix securely plumb and true to line.
  - **Externally socketed pipes and fittings**: Fix with sockets facing upstream.
  - **Vertical pipes**: Provide a loadbearing support not less than every storey level. Locate at or close below socket collar or coupling. Tighten fixings as work proceeds so that every storey is self-supporting.
  - **Additional supports**: Provide as necessary to support junctions and changes in direction.
- **Wall and floor penetrations**:
  - **Isolating pipework**: Isolate pipework from structure, e.g. with pipe sleeves.
  - **Masking plates**: Fix at penetrations if visible in the finished work.
- **Expansion joint sockets**: Fix rigidly to the building.
- **Fixings**: Allow the pipe to slide.

50-10-05/622 Access to above ground wastewater drainage systems for testing and maintenance

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

90-10-90/610 Installation of valves generally type B

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

90-10-90/660 Installation of discharge connections

- **General requirements**: 90-10-90/610 Installation of valves generally type B.
- **Safety and relief valves**: Terminate at a safe discharge point.
- **Vent cocks**: Terminate 150 mm above floor level.
- **Air bottles**: Terminate with air cock or needle valve in a convenient position.
- **Automatic air vents**: Terminate over a suitable gully or drain line in a visible location.

90-90-55/660 Installing identification on pipework

- **Application of basic identification colour**: Coloured bands as BS 1710.

- **Safety colour identification**: On or next to the colour bands.
- **Information**: Name of contents in full.

System completion

50-10-05/810 Testing above ground wastewater drainage systems

- **Dates for testing**:
  - **Notice**: Required.
  - **Period of notice (minimum)**: 5 working days.
- **Preparation**:
  - **Pipework**: Securely fixed and free from obstruction and debris.
  - **Traps**: Fill with clean water.
- **Testing**:
  - **Water for testing**: Supply clean water, assistance and apparatus.
  - **Smoke for testing**: Do not use.
- **Records of tests**: Submit.

50-10-05/820 Above ground wastewater drainage system pipework airtightness test

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

50-10-05/830 Above ground wastewater drainage system siphonage and back pressure tests

- **Method**:
  - **WC pans**: Test by flushing.
  - **Other appliances**: Test by filling to overflow level, then removing the plug.
- **Number of tests**: Test each appliance.
- **Self siphonage testing**: Test each appliance individually.
- **Induced siphonage and back pressure testing**: Test by discharging the following appliances simultaneously on each stack.

50-10-05/840 Above ground wastewater drainage system pre-handover checks

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

50-10-05/850 Above ground wastewater drainage system submittals

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

50-10-05/860 Documentation

- **Operating and maintenance instructions**:

  - **Scope**: Submit for the system giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Paper copy & Electronic.
  - **Number of copies**: Two.
- **Record drawings**:
  - **Content**: Location and arrangement of plant in plant rooms;
    Location, size and route of above ground services;
    and Location of outlets.
  - **Format**: A1 paper print and Electronic.
  - **Number of copies**: Two.
- **Submittal date**: At handover.

Ω End of system

55-40-40/120 Cold water supply system

System outline

55-40-40/120 Cold water supply system

- **Description**: The existing cold water supply system shall be retained and adapted to provide cold water connections to the new sanitary appliance locations within the new ground floor WCs.

  Existing connections shall be retained and reused where possible.

  Wherever possible all pipework shall be routed in concealed locations with appropriate access.

  All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings and schedules of equipment.

  The contractor shall ensure the installation complies with the relevant European, and British standards and requirements.

  The contractor shall submit all drawings, technical information, calculations, and equipment selections/manufacturers literature for approval by the client/design team prior to installation.

  Where pipework is exposed it shall be installed to a high standard in chromed copper, true to line, level and with adequate support fittings.

  The complete new and retained / adapted pipework system shall be flush and chlorinated at the completion of the works.

- **Arrangement**: Mains.
- **Water meters**: Existing.
- **Pipelines**:
  - **Below ground**: Existing.
  - **Above ground**: 90-10-65/310 Copper pipelines.
- **Pipeline accessories**:
- **Valves**:
  - **Isolating valves**: 90-10-90/342 Copper alloy gate valves.
  - **Check valves**: 90-10-90/352 Copper alloy check valves.
  - **Draining devices**: 90-10-90/374 Draining taps.
- **Thermal insulation**:
  - **Pipelines**: 90-90-40/360 Phenolic foam insulation.
- **Accessories**: 90-90-60/390 Services supports type A.
- **Plant and equipment identification**: 90-90-55/430 Identifying pipework type A and 90-90-55/480 Mechanical plant and equipment identification labels type A.
- **Execution**: 55-40-40/620 Installing hot and cold water systems generally; 55-40-40/650 Hydraulic pressure testing of hot and cold water supply systems; 55-40-40/660 Flushing hot and cold water systems; and 55-40-40/670 Disinfection of hot and cold water systems.
- **System completion**: 55-40-40/810 Commissioning of hot and cold water supply systems;

55-40-40/820 Inspection and test records;
55-40-40/830 Demonstrations;
55-40-40/840 Documentation;
55-40-40/850 Water quality tests;
55-40-40/870 Operating tools;
and 55-40-40/880 Maintenance.

Products

90-10-65/310 Copper pipelines

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **General requirements**: 90-10-65/320 Copper pipeline jointing materials and 90-10-65/315 Copper pipeline fittings.
- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 1057.
- **Grade**: R250.
- **Finish**: Plain and Chrome plated where on exposed to view.
- **Execution**: 90-10-65/630 Installing copper pipelines and 90-10-65/635 Brazed joints in copper and copper alloy pipes.

90-10-65/315 Copper pipeline fittings

- **Manufacturer**: Contractor's choice.
- **Standards**:
  - **Capillary**: To BS EN 1254-1, solder ring.

90-10-65/320 Copper pipeline jointing materials

- **Manufacturer**: Contractor's choice.
- **Standards**:
  - **Lead free solder for capillary fittings**: To BS EN ISO 9453.
  - **Brazing filling**: To BS EN ISO 17672.

90-10-90/342 Copper alloy gate valves

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 12288.
- **Connections**: Compression to BS EN 1254-2.
- **Options**: Handwheel and Lever.
- **Execution**: 90-10-90/610 Installation of valves generally type A.

90-10-90/352 Copper alloy check valves

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS 5154.
- **Lift type**:
  - **Body pattern**: Straight.
- **Material**: Copper alloy.

- **Connections**: Compression to BS EN 1254-2.
- **Execution**: 90-10-90/670 Installation of check valves.

90-10-90/374 Draining taps

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS 2879.
- **Size**: ½ inch.
- **Material**: Copper alloy.
- **Connections**: Threaded joints to BS EN 10226-1.
- **Execution**: 90-10-90/610 Installation of valves generally type A.

90-90-40/360 Phenolic foam insulation

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 13166.
- **Form**: Pipe section.
- **Thermal conductivity**: 0.018 W/m·K at 0°C.
  0.018 W/m·K at 10°C.
  0.023 W/m·K at 50°C.
  0.025 W/m·K at 75°C.
- **Finish**: Plain.
- **Insulation thickness (minimum)**: To BS 5422.
- **Vapour barrier**:
  - **Material**: Aluminium
  - **Vapour permeability**: To BS 5422, clause 5.6.
- **Execution**: 90-90-40/640 Installing phenolic foam insulation on pipelines.

90-90-55/430 Identifying pipework type A

Shared by: 50-10-05/120 Above ground wastewater drainage system with internal stacks; 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standards**: To BS 1710.
- **Identification type**: Adhesive colour bands.
- **Execution**: 90-90-55/660 Installing identification on pipework.

90-90-55/480 Mechanical plant and equipment identification labels type A

Shared by: 55-40-40/120 Cold water supply system; 55-40-40/150 Direct hot water storage supply system; and 65-10-95/140 Mechanical extract ventilation system.

- **Material**: Face engraved rigid plastic laminate.
- **Label size**: 25mm dia
- **Colour**:
  - **Background**: White.
  - **Lettering**: Black.
- **Information to be included**: Equipment reference number.

- **Execution**: 90-90-55/610 Installing mechanical plant and equipment identification.

90-90-60/390 Services supports type A
Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Support type**: Proprietary support channels and fixings.

Execution

55-40-40/620 Installing hot and cold water systems generally
Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standard**: To BS 8558 and BS EN 806-4.
- **Performance**: Free from leaks and the audible effects of expansion, vibration and water hammer.
- **Fixing of equipment, components and accessories**: Fix securely, parallel or perpendicular to the structure of the building.
- **Preparation**: Immediately before installing tanks and cisterns on a floor or platform, clear the surface completely of debris and projections.
- **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.

55-40-40/650 Hydraulic pressure testing of hot and cold water supply systems
Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/660 Flushing hot and cold water systems
Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/670 Disinfection of hot and cold water systems
Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

90-10-65/610 Pipelines installation generally
- **Standard**: BESATechnical Report TR/20/1 LTHW heating pipework systems and BESATechnical Report TR/20/5 Cold water service.
- **Dissimilar metals**: Prevent electrolytic corrosion.

90-10-65/615 Installing pipeline fittings

- **Fabricated junctions and fittings**: Same material as the main pipeline.
- **Demountable joints**: Regularly spaced along pipeline runs and at items of equipment.

90-10-65/620 Installing anchors generally

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

90-10-65/625 Installing slide guides

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

90-10-65/630 Installing copper pipelines

- **General requirements**: 90-10-65/690 Spacing of pipelines;
  90-10-65/625 Installing slide guides;
  90-10-65/615 Installing pipeline fittings;
  90-10-65/610 Pipelines installation generally;
  90-10-65/710 General inspection and testing;
  and 90-10-65/620 Installing anchors generally.
- **Standard**: In accordance with CDA publications 88 Copper tube in buildings.
- **Jointing method**:
  - **Permanently concealed joints**: Soldered
  - **Accessible joints**: Capillary, up to 67 mm for pressure up to 600 kPa and 110°C.
- **Anchor**:
  - **Method**: Two flanges fixed to copper female adaptors.
  - **Pipe restraints**: Saddle clamps.

90-10-65/635 Brazed joints in copper and copper alloy pipes

- **Preparation, marking and sealing**: In accordance with BS EN 14324.

90-10-65/690 Spacing of pipelines

- **Minimum clearance between insulated pipelines and**:
  - **Wall finish**: 25 mm.
  - **Ceiling finish or soffit**: 100 mm.
  - **Floor**: 150 mm.
  - **Electrical services**: 150 mm.
  - **Adjacent services**: 100 mm.
  - **Uninsulated pipeline**: 75 mm.
  - **Another insulated pipeline**: 25 mm.
- **Minimum clearance between uninsulated pipelines and**:
  - **Wall finish**: 25 mm.

  - **Ceiling finish or soffit**: 100 mm.
  - **Floor**: 150 mm.
  - **Electrical services**: 150 mm.
  - **Adjacent services**: 150 mm.
  - **Another uninsulated pipeline**: 25 mm.

90-10-65/710 General inspection and testing

- **Inspection of joints**:
  - **Joints**: Cut out, cut open and inspect.
  - **Number of joints**: Two.
- **Safety precautions**: In accordance with HSEGS 4.

90-10-90/610 Installation of valves generally type A

Shared by: 90-10-90/342 Copper alloy gate valves; 90-10-90/370 Thermostatic mixing valves; 90-10-90/374 Draining taps; and 90-10-90/670 Installation of check valves.

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

90-10-90/670 Installation of check valves

- **General requirements**: 90-10-90/610 Installation of valves generally type A.
- **Lift type**: Install in direction of flow as indicated on the body.
- **Disc type**: With spring, fit in any plane. Without spring, fit in vertical plane with flow from bottom to top.
- **Wafer type**: Install between flanges. Fit in horizontal plane or vertical upward flow.
- **Split disc**: Install between flanges. Fit in horizontal plane or vertical upward flow.

90-90-40/610 Installing insulation and protection products generally

- **Standard**: In accordance with BS 5970.
- **Timing**: Insulate after installed system has been fully tested and joints proved sound.
- **Insulation**: Do not enclose adjacent units together.
- **Clearance**: Maintain between pipes.
- **Finish**: Neatly finish joints, corners, edges and overlaps.

90-90-40/640 Installing phenolic foam insulation on pipelines

- **General requirements**: 90-90-40/610 Installing insulation and protection products generally.
- **Joints**: Close butt, seal with 50 mm wide class 0 tape on both longitudinal and circumferential joints.
- **At fittings**: Mitre. Secure with tape.
- **Vapour seal**: Tape exposed insulation membrane. Seal vapour barrier at pipe support with class 0 tape.

90-90-55/610 Installing mechanical plant and equipment identification

- **Fixing**: Fix with adhesive to equipment.
- **Position**: On equipment.

90-90-55/660 Installing identification on pipework

- **Application of basic identification colour**: Coloured bands as BS 1710.
- **Safety colour identification**: On or next to the colour bands.
- **Information**: Name of contents in full.

System completion

55-40-40/810 Commissioning of hot and cold water supply systems

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Pre-commissioning**: In accordance with BSRIABG 2/2010 and CIBSECommissioning Code W.
- **Commissioning**: In accordance with BS EN 806-4, BSRIABG 2/2010 and CIBSECommissioning Code W.
- **Notice (minimum)**: 1 week.
- **Equipment**: Check and adjust operation of equipment, controls and safety devices.
- **Outlets**: Check operation of outlets for satisfactory rate of flow and temperature.

55-40-40/820 Inspection and test records

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Construction phase reports**: Post-installation.
- **Records for water systems**: In accordance with BSRIABG 2/2010.
- **Record sheets**:
  - **Number of copies**: Two

55-40-40/830 Demonstrations

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/840 Documentation

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Operating and maintenance instructions**:
  - **Scope**: Submit for the system giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Paper copy.
  - **Number of copies**: Two.
- **Record drawings**:
  - **Content**: Location and arrangement of plant in plant rooms;
    Location, size and route of hot and cold water services;
    and Location of outlets.
  - **Format**: A1 paper print and Electronic.
  - **Number of copies**: Two.

- **Submittal date**: At handover.
- **Wholesome water consumption notice**: Submit within 30 days.

55-40-40/850 Water quality tests

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standard**: To BS EN 806-4.
- **Samples**:
  - **Sample points**: Main supply to site and Hot water storage cylinder.
  - **Samples for analysis**: Submit samples for bacteriological analysis.
- **Water temperature**: Record at each sampling point at the time of taking the sample.
- **Test results**:
  - **Record**: Details of all analyses.
  - **Submit**: On completion.
  - **Number of copies**: Two.

55-40-40/870 Operating tools

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/880 Maintenance

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Servicing and maintenance**: Undertake for 12 months after completion.

Ω End of system

55-40-40/150 Direct hot water storage supply system

System outline

55-40-40/150 Direct hot water storage supply system

- **Description**: The existing direct electric hot water storage cylinder shall be retained.

  Existing connections shall be retained and reused where possible.

  Wherever possible all pipework shall be routed in concealed locations with appropriate access.

  All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings and schedules of equipment.

  The contractor shall ensure the installation complies with the relevant European, and British standards and requirements.

  The contractor shall submit all drawings, technical information, calculations, and equipment selections/manufacturers literature for approval by the client/design team prior to installation.

  Where pipework is exposed it shall be installed to a high standard in chromed copper, true to line, level and with adequate support fittings.

  The contractor shall provide new hot water connections to serve the new sinks, wash hand basins, and WCs.

  Hot water outlets shall be complete with Thermostatic mixing valves (TMVs) or have integral TMVs.

  All final connection to appliances, shall be provided with hot water connection shall be complete with a chromium plated quater turn lever isolation ball valve.

  Contractor is to ensure access doors and isolation valves are to be located in positions that are fully accessible.

  The complete new and retained / adapted pipework system shall be flush and chlorinated at the completion of the works.
- **Storage unit**: Existing.
- **Electric immersion heater**: Existing.
- **System**: Unvented.
- **Capacity**: Existing.
- **Pumps**: Existing.
- **Pipelines**: 90-10-65/310 Copper pipelines.
- **Pipeline accessories**:
  - **Gauges**: Existing.
  - **Pipeline supports**: 90-90-60/390 Services supports type A.
- **Valves**:
  - **Isolating valves**: 90-10-90/342 Copper alloy gate valves.
  - **Check valves**: 90-10-90/352 Copper alloy check valves.
  - **Mixing valves**: 90-10-90/370 Thermostatic mixing valves.

  - **Draining devices**: 90-10-90/374 Draining taps.
  - **Accessories**: Thermostatic circulation valves
- **Fire stopping**: Multiple services penetration fire stopping system.
- **Thermal insulation**:
  - **Pipelines**: 90-90-40/360 Phenolic foam insulation.
- **Controls**: .
- **Plant and equipment identification**: 90-90-55/430 Identifying pipework type A and 90-90-55/480 Mechanical plant and equipment identification labels type A.
- **Execution**: 55-40-40/620 Installing hot and cold water systems generally; 55-40-40/650 Hydraulic pressure testing of hot and cold water supply systems; 55-40-40/660 Flushing hot and cold water systems; and 55-40-40/670 Disinfection of hot and cold water systems.
- **System completion**: 55-40-40/810 Commissioning of hot and cold water supply systems; 55-40-40/820 Inspection and test records; 55-40-40/830 Demonstrations; 55-40-40/840 Documentation; 55-40-40/850 Water quality tests; 55-40-40/870 Operating tools; and 55-40-40/880 Maintenance.

Products

90-10-65/310 Copper pipelines

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **General requirements**: 90-10-65/320 Copper pipeline jointing materials and 90-10-65/315 Copper pipeline fittings.
- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 1057.
- **Grade**: R250.
- **Finish**: Plain and Chrome plated where on exposed to view.
- **Execution**: 90-10-65/630 Installing copper pipelines and 90-10-65/635 Brazed joints in copper and copper alloy pipes.

90-10-65/315 Copper pipeline fittings

- **Manufacturer**: Contractor's choice.
- **Standards**:
  - **Capillary**: To BS EN 1254-1, solder ring.

90-10-65/320 Copper pipeline jointing materials

- **Manufacturer**: Contractor's choice.
- **Standards**:
  - **Lead free solder for capillary fittings**: To BS EN ISO 9453.
  - **Brazing filling**: To BS EN ISO 17672.

90-10-90/342 Copper alloy gate valves

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 12288.
- **Connections**: Compression to BS EN 1254-2.
- **Options**: Handwheel and Lever.
- **Execution**: 90-10-90/610 Installation of valves generally type A.

90-10-90/352 Copper alloy check valves

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS 5154.
- **Lift type**:
  - **Body pattern**: Straight.
- **Material**: Copper alloy.
- **Connections**: Compression to BS EN 1254-2.
- **Execution**: 90-10-90/670 Installation of check valves.

90-10-90/370 Thermostatic mixing valves

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 1111.
- **Arrangement**: Single control.
- **Connections**: Threaded to BS EN ISO 228-1.
- **Execution**: 90-10-90/610 Installation of valves generally type A.

90-10-90/374 Draining taps

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS 2879.
- **Size**: ½ inch.
- **Material**: Copper alloy.
- **Connections**: Threaded joints to BS EN 10226-1.
- **Execution**: 90-10-90/610 Installation of valves generally type A.

90-90-40/360 Phenolic foam insulation

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Manufacturer**: Contractor's choice.
- **Standard**: To BS EN 13166.
- **Form**: Pipe section.
- **Thermal conductivity**: 0.018 W/m·K at 0°C.
  0.018 W/m·K at 10°C.
  0.023 W/m·K at 50°C.
  0.025 W/m·K at 75°C.
- **Finish**: Plain.
- **Insulation thickness (minimum)**: To BS 5422.
- **Vapour barrier**:

  - **Material**: Aluminium
  - **Vapour permeability**: To BS 5422, clause 5.6.
- **Execution**: 90-90-40/640 Installing phenolic foam insulation on pipelines.

90-90-55/430 Identifying pipework type A

Shared by: 50-10-05/120 Above ground wastewater drainage system with internal stacks; 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standards**: To BS 1710.
- **Identification type**: Adhesive colour bands.
- **Execution**: 90-90-55/660 Installing identification on pipework.

90-90-55/480 Mechanical plant and equipment identification labels type A

Shared by: 55-40-40/120 Cold water supply system; 55-40-40/150 Direct hot water storage supply system; and 65-10-95/140 Mechanical extract ventilation system.

- **Material**: Face engraved rigid plastic laminate.
- **Label size**: 25mm dia
- **Colour**:
  - **Background**: White.
  - **Lettering**: Black.
- **Information to be included**: Equipment reference number.
- **Execution**: 90-90-55/610 Installing mechanical plant and equipment identification.

90-90-60/390 Services supports type A

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Support type**: Proprietary support channels and fixings.

Execution

55-40-40/620 Installing hot and cold water systems generally

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standard**: To BS 8558 and BS EN 806-4.
- **Performance**: Free from leaks and the audible effects of expansion, vibration and water hammer.
- **Fixing of equipment, components and accessories**: Fix securely, parallel or perpendicular to the structure of the building.
- **Preparation**: Immediately before installing tanks and cisterns on a floor or platform, clear the surface completely of debris and projections.
- **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.

55-40-40/650 Hydraulic pressure testing of hot and cold water supply systems

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standard**: To BS 8558 and BS EN 806-4.
- **Notice (minimum)**: 1 week.
- **Pressure**: 1.5 times working pressure.

- **Duration of test**: 1 h.

55-40-40/660 Flushing hot and cold water systems

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/670 Disinfection of hot and cold water systems

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

90-10-65/610 Pipelines installation generally

- **Standard**: BESATechnical Report TR/20/1 LTHW heating pipework systems and BESATechnical Report TR/20/5 Cold water service.
- **Dissimilar metals**: Prevent electrolytic corrosion.

90-10-65/615 Installing pipeline fittings

- **Fabricated junctions and fittings**: Same material as the main pipeline.
- **Demountable joints**: Regularly spaced along pipeline runs and at items of equipment.

90-10-65/620 Installing anchors generally

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

90-10-65/625 Installing slide guides

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

90-10-65/630 Installing copper pipelines

- **General requirements**: 90-10-65/690 Spacing of pipelines;
  90-10-65/625 Installing slide guides;
  90-10-65/615 Installing pipeline fittings;
  90-10-65/610 Pipelines installation generally;
  90-10-65/710 General inspection and testing;
  and 90-10-65/620 Installing anchors generally.
- **Standard**: In accordance with CDA publications 88 Copper tube in buildings.
- **Jointing method**:

  - **Permanently concealed joints**: Soldered
  - **Accessible joints**: Capillary, up to 67 mm for pressure up to 600 kPa and 110°C.
- **Anchor**:
  - **Method**: Two flanges fixed to copper female adaptors.
  - **Pipe restraints**: Saddle clamps.

90-10-65/635 Brazed joints in copper and copper alloy pipes

- **Preparation, marking and sealing**: In accordance with BS EN 14324.

90-10-65/690 Spacing of pipelines

- **Minimum clearance between insulated pipelines and**:
  - **Wall finish**: 25 mm.
  - **Ceiling finish or soffit**: 100 mm.
  - **Floor**: 150 mm.
  - **Electrical services**: 150 mm.
  - **Adjacent services**: 100 mm.
  - **Uninsulated pipeline**: 75 mm.
  - **Another insulated pipeline**: 25 mm.
- **Minimum clearance between uninsulated pipelines and**:
  - **Wall finish**: 25 mm.
  - **Ceiling finish or soffit**: 100 mm.
  - **Floor**: 150 mm.
  - **Electrical services**: 150 mm.
  - **Adjacent services**: 150 mm.
  - **Another uninsulated pipeline**: 25 mm.

90-10-65/710 General inspection and testing

- **Inspection of joints**:
  - **Joints**: Cut out, cut open and inspect.
  - **Number of joints**: Two.
- **Safety precautions**: In accordance with HSEGS 4.

90-10-90/610 Installation of valves generally type A

Shared by: 90-10-90/342 Copper alloy gate valves; 90-10-90/370 Thermostatic mixing valves; 90-10-90/374 Draining taps; and 90-10-90/670 Installation of check valves.

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

90-10-90/670 Installation of check valves

- **General requirements**: 90-10-90/610 Installation of valves generally type A.
- **Lift type**: Install in direction of flow as indicated on the body.

- **Disc type**: With spring, fit in any plane. Without spring, fit in vertical plane with flow from bottom to top.
- **Wafer type**: Install between flanges. Fit in horizontal plane or vertical upward flow.
- **Split disc**: Install between flanges. Fit in horizontal plane or vertical upward flow.

90-90-40/610 Installing insulation and protection products generally

- **Standard**: In accordance with BS 5970.
- **Timing**: Insulate after installed system has been fully tested and joints proved sound.
- **Insulation**: Do not enclose adjacent units together.
- **Clearance**: Maintain between pipes.
- **Finish**: Neatly finish joints, corners, edges and overlaps.

90-90-40/640 Installing phenolic foam insulation on pipelines

- **General requirements**: 90-90-40/610 Installing insulation and protection products generally.
- **Joints**: Close butt, seal with 50 mm wide class 0 tape on both longitudinal and circumferential joints.
- **At fittings**: Mitre. Secure with tape.
- **Vapour seal**: Tape exposed insulation membrane. Seal vapour barrier at pipe support with class 0 tape.

90-90-55/610 Installing mechanical plant and equipment identification

- **Fixing**: Fix with adhesive to equipment.
- **Position**: On equipment.

90-90-55/660 Installing identification on pipework

- **Application of basic identification colour**: Coloured bands as BS 1710.
- **Safety colour identification**: On or next to the colour bands.
- **Information**: Name of contents in full.

System completion

55-40-40/810 Commissioning of hot and cold water supply systems

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Pre-commissioning**: In accordance with BSRIABG 2/2010 and CIBSECommissioning Code W.
- **Commissioning**: In accordance with BS EN 806-4, BSRIABG 2/2010 and CIBSECommissioning Code W.
- **Notice (minimum)**: 1 week.
- **Equipment**: Check and adjust operation of equipment, controls and safety devices.
- **Outlets**: Check operation of outlets for satisfactory rate of flow and temperature.

55-40-40/820 Inspection and test records

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Construction phase reports**: Post-installation.
- **Records for water systems**: In accordance with BSRIABG 2/2010.
- **Record sheets**:
  - **Number of copies**: Two

55-40-40/830 Demonstrations

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Running of plant**:

  - **Operation**: Run, maintain and supervise the installations under normal working conditions.
  - **Duration**: 1 week.
- **Instruction**: Instruct and demonstrate the purpose, function and operation of the installations.

55-40-40/840 Documentation

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Operating and maintenance instructions**:
  - **Scope**: Submit for the system giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Paper copy.
  - **Number of copies**: Two.
- **Record drawings**:
  - **Content**: Location and arrangement of plant in plant rooms;
    Location, size and route of hot and cold water services;
    and Location of outlets.
  - **Format**: A1 paper print and Electronic.
  - **Number of copies**: Two.
- **Submittal date**: At handover.
- **Wholesome water consumption notice**: Submit within 30 days.

55-40-40/850 Water quality tests

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Standard**: To BS EN 806-4.
- **Samples**:
  - **Sample points**: Main supply to site and Hot water storage cylinder.
  - **Samples for analysis**: Submit samples for bacteriological analysis.
- **Water temperature**: Record at each sampling point at the time of taking the sample.
- **Test results**:
  - **Record**: Details of all analyses.
  - **Submit**: On completion.
  - **Number of copies**: Two.

55-40-40/870 Operating tools

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

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

55-40-40/880 Maintenance

Shared by: 55-40-40/120 Cold water supply system; and 55-40-40/150 Direct hot water storage supply system.

- **Servicing and maintenance**: Undertake for 12 months after completion.

Ω End of system

60-45-40/160 Electric heating system

System outline

60-45-40/160 Electric heating system

- **Description**: The new extension shall be heated by electric panel heaters operated on time control with manual override and frost protection facilities within the integral controller to each heater.

  The electric panel heaters have been detailed in the mechanical schedules.

  The kitchen shall be provided with new electical blow heaters, all connected onto a common thermostat / programmer located in the kitchen. The heaters shall be wired bakc to a new distribution board and provided with a common contactor to interpose with the common thermostat.

  The kitchen thermostat shall be of the electronic programmable type with time schedule and frost protection settings.

  All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings and schedules of equipment.

  The contractor shall ensure the installation complies with the relevant European, and British standards and requirements.

  The contractor shall submit all drawings, technical information, calculations, and equipment selections/manufacturers literature for approval by the client/design team prior to installation.
- **Heat emitters**: 90-40-35/450 Room heaters.
- **Controls**:
  - **Type**: Integral to appliance.
  - **Connectivity**: Wired.
  - **Type of controller**: Thermostat and timed control with Frost Protection
  - **Features**: Automatic on/ off timer;
    Manual override facility;
    Frost protection mode;
    and Thermal overload protection – automatic reset.
- **Plant and equipment identification**: 90-90-55/310 Electrical identification and notices and 90-90-55/390 Equipment labels and warning notices.
- **Execution**: 60-45-40/640 Installing electric heating systems.
- **System completion**: 60-45-40/845 Demonstrations and 60-45-40/860 Documentation.

Products

90-40-35/450 Room heaters

- **Manufacturer**: Refer to equipment schedules
- **Standards**: To BS EN 60335-1 and BS EN 60335-2-30.
- **Third party certification**: Manufacturer's standard.
- **Room heaters type**: Panel.
- **Output**: Refer to equipment schedules
- **Size**:

  - **Length (maximum)**: Refer to equipment schedules
  - **Height (maximum)**: Refer to equipment schedules
  - **Depth (maximum)**: Refer to equipment schedules
- **Finish**: Manufacturer's standard.
- **Execution**: 90-40-35/610 Installing heat emitters generally.

90-90-55/310 Electrical identification and notices

- **Manufacturer**: Contractor's choice.
- **Standards**: In accordance with BS 7671 and To BS ISO 3864-1.

90-90-55/390 Equipment labels and warning notices

- **Manufacturer**: Contractor's choice.
- **Material**: Face engraved rigid plastic laminate.
- **Label size**: Manufacturer's standard.
- **Colour**:
  - **Background**: White.
  - **Lettering**: Black.
- **Typography**:
  - **Font**: Arial.
  - **Size**: 5mm.
- **Notice wording**: Submit proposals.

Execution

60-45-40/640 Installing electric heating systems

- **Standard**: In accordance with BS 7671.

90-40-35/610 Installing heat emitters generally

- **Fixing**: Secure and parallel or perpendicular to the structure of the building.
- **Stud walls**: Fix to studs and/ or noggings.

System completion

60-45-40/845 Demonstrations

- **Running of plant**:
  - **Operation**: Run, maintain and supervise the installations under normal working conditions.
  - **Duration**: One week.
- **Instruction**: Instruct and demonstrate the purpose, function and operation of the installations.

60-45-40/860 Documentation

- **Operating and maintenance instructions**:
  - **Scope**: Submit for the system giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Hardcopy and Electronic
  - **Number of copies**: Two.

- **Record drawings**:
  - **Content**: Location and arrangement of plant in plant rooms and Location, size and route of mechanical services.
  - **Format**: A1 paper print drawing and Electronic drawing.
  - **Number of copies**: Two.
- **Submittal date**: At handover.

Ω End of system

65-10-95/140 Mechanical extract ventilation system

System outline

65-10-95/140 Mechanical extract ventilation system

- **Description**: The existing WC extract fans are to be isolated, disconnected and removed.

  New extract fans are to be installed, comissioned and set to work to serve the WCs.

  A new fan shall be provided to serve the kitchen and shall include the manufacturers proprietary on/off and speed control.

  The new extract fans and airflow rates have been detailed in the mechanical schedules.

  All specifications are to be read in conjunction with preliminaries/general conditions, relevant drawings and schedules of equipment.

  The contractor shall ensure the installation complies with the relevant European, and British standards and requirements.

  The contractor shall submit all drawings, technical information, calculations, and equipment selections/manufacturers literature for approval by the client/design team prior to installation.
- **Air ductwork and accessories**:
  - **Ductwork**: 90-45-25/310 Circular plastics ductwork and fittings.
- **Extract fans**: Refer to schedules
- **External exhaust air terminals**: Roof cowls and Wall Louvres
- **Controls**: 75-75-50/160 Mechanical extract systems control.
- **Identification of ductwork and equipment**: 90-90-55/480 Mechanical plant and equipment identification labels.
- **Execution**: 65-10-95/640 Ductwork systems cleaning.
- **System completion**: 65-10-95/810 Commissioning of air distribution systems; 65-10-95/820 Performance testing; 65-10-95/830 Inspection and test records; 65-10-95/850 Documentation for ventilation systems; and 65-10-95/870 Maintenance.

Products

90-45-25/310 Circular plastics ductwork and fittings

- **Standard**: To BESADW/154.
- **Classification**: Submit proposals.
- **Environmental conditions**: Submit proposals.
- **Material**: Unplasticized polyvinyl chloride.
- **Regulating dampers**:
  - **Standard**: To BESADW/154.
  - **Type**: Backdraft.
  - **Operation**: Automatic.
- **Access openings**:

  - **Purpose**: Inspection and Cleaning.
  - **Sizes**: To BS EN 12097.
- **Execution**: 90-45-25/610 Air ductwork generally;
  90-45-25/630 Installing plastics ductwork;
  90-45-25/690 Drainage of ductwork;
  and 90-45-25/720 Weatherproofing ductwork penetrations.

90-90-55/480 Mechanical plant and equipment identification labels type A

Shared by: 55-40-40/120 Cold water supply system; 55-40-40/150 Direct hot water storage supply system; and 65-10-95/140 Mechanical extract ventilation system.

- **Material**: Face engraved rigid plastic laminate.
- **Label size**: 25mm dia
- **Colour**:
  - **Background**: White.
  - **Lettering**: Black.
- **Information to be included**: Equipment reference number.
- **Execution**: 90-90-55/610 Installing mechanical plant and equipment identification.

Execution

65-10-95/640 Ductwork systems cleaning

- **Standards**: In accordance with BESATechnical Report TR/19 and to BS EN 15780.
- **Specialist**: Contractor's choice.
- **Cleaning methods**:
  - **Manual**: Hand wipe;
    Hand brushing;
    and Hand vacuum.
- **Verification**:
  - **Method**: Visual inspection.
  - **Completion report**:

90-45-25/610 Air ductwork generally

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

90-45-25/630 Installing plastics ductwork

- **Standard**: To BESADW/154.
- **Hangers and supports**: Install in accordance with BSRIABG 10/2010.
- **Installing flexible joint connections**: Fit on fan inlets and outlets;
  Fit at building expansion joints;
  and Install fully stretched to minimize pressure drop.

90-45-25/690 Drainage of ductwork

- **Ductwork**: Install to drain entrained moisture.
- **Joints**: Lap to minimize moisture leakage.

90-45-25/720 Weatherproofing ductwork penetrations

- **Roof penetrations**: Submit proposals.

- **Wall penetrations**: Submit proposals.

90-90-55/610 Installing mechanical plant and equipment identification

- **Fixing**: Fix with adhesive to equipment.
- **Position**: On equipment.

System completion

65-10-95/810 Commissioning of air distribution systems

- **Pre-commissioning**: In accordance with BSRIABG 49/2015 and CIBSECommissioning code A.
- **Commissioning**: In accordance with BSRIABG 49/2015 and CIBSECommissioning code A.
- **Notice (minimum)**: One week.

65-10-95/820 Performance testing

- **General**: Demonstrate the performance of the installations.
- **Guaranteed efficiency**: Tolerances defined in this specification.
- **Reports**: Submit on completion.

65-10-95/830 Inspection and test records

- **Reports**:
  - **Construction phase**: Post-installation.
- **Records for air systems**: In accordance with BSRIABG 49/2015.
- **Record sheets**:
  - **Number of copies**: Two

65-10-95/850 Documentation for ventilation systems

- **Operating and maintenance instructions**:
  - **Scope**: Submit for the system as a whole giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Paper copy.
  - **Number of copies**: Two.
- **Submittal date**: At handover.

65-10-95/870 Maintenance

- **Servicing and maintenance**: Undertake for 12 months after completion.

Ω End of system

75-75-50/160 Mechanical extract systems control

System outline

75-75-50/160 Mechanical extract systems control

- **Description**: The toilet extract system serving the disabled WC, comprising of a single fan unit that will run primarliy under the dictates of switched relay from the lighting circuit. The fan shall be complete with an over run timer set for 5 minutes to enalbe the fan to run on once the room has been vacated and the lights switched off.

  The toilet extract systems, serving the Male, Female and Childrens WCs, comprising of a single fan units that will run primarliy under the dictates of passive infrared (PIR) presence detector. Each fan shall be complete with an over run timer set for 5 minutes to enable the fan to run on once the room has been vacated.

  Provide a new Kitchen Extract fan with proprietary manual on/off and speed control.
- **Objectives**: See description above
- **Start and stop control**: Switched relay from lighting circuit for Disabled WC
  Passive Infrared (PIR) detection for Male, Female and Childrens WCs
- **Extract fan control strategies**: 75-75-50/272 Constant volume extract fan control strategy.
- **Equipment**: Refer to schedules
- **Equipment interconnectivity**: Standalone equipment
- **Control equipment power supply**: Mains supply.
- **System completion**: 75-75-50/810 Inspection and testing;
  75-75-50/820 Start up and commissioning;
  75-75-50/830 Commissioning of automatic control systems;
  75-75-50/860 Documentation;
  and 75-75-50/870 Servicing and maintenance.

System performance

75-75-50/272 Constant volume extract fan control strategy

- **Fan control**:
  - **Normal operation**: Enable fan and start on receipt of on signal.
- **Shut down**: Disable fan.

System completion

75-75-50/810 Inspection and testing

- **Standard**: In accordance with BS 7671.
- **Notice before commencing tests (minimum)**: One week.
- **Certificates**: Submit two.
- **Test equipment identity**: Record on test certificates.
- **Certificates of calibration**: Submit for each test instrument.
- **Control panel test certificates**: Submit two.

75-75-50/820 Start up and commissioning

- **Standard**: In accordance with BCIA Start up and commissioning guide.

75-75-50/830 Commissioning of automatic control systems

- **Pre-commissioning**: In accordance with Commissioning Code C.
- **Commissioning**: In accordance with Commissioning Code C.
- **Notice (minimum)**: One week.

75-75-50/860 Documentation

- **Operating and maintenance instructions**:
  - **Scope**: Submit giving optimum settings for controls.
  - **Product information**: Include product description, date of purchase, performance characteristics, application (suitability for use), method of operation and control, and cleaning and maintenance requirements.
  - **Format**: Paper copy & Electronic
  - **Number of copies**: Two.
- **Record drawings**:
  - **Content**: For all controls cabling, the cable origin, circuit designation, route, conductor material and insulation type and colour, number of cores per cable, number of cables in ducts, on tray or ladder and Location of control panels, equipment and repeater panels.
  - **Format**: A1 paper print and Electronic.
  - **Number of copies**: Two.
- **Submittal date**: At handover.

75-75-50/870 Servicing and maintenance

- **Requirement**: Undertake until 12 months after completion.

Ω End of system