Mechanical Services Standard Specification
9.0 - Above Ground Soil, Waste and Ventilation Pipes

May 2010

For
ROYAL HOLLOWAY
UNIVERSITY OF LONDON
## AMENDMENTS

<table>
<thead>
<tr>
<th>Author</th>
<th>Date/Rev</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D Bantock / A Wakelam</td>
<td>January 2010</td>
<td>Draft Issue</td>
</tr>
<tr>
<td>W Shipley</td>
<td>May 2010</td>
<td>Comments incorporated after meeting with RHUL</td>
</tr>
</tbody>
</table>
9.1 **INTRODUCTION**

This specification is for the supply and installation of above ground drainage pipework systems connecting to the buildings, below ground drainage systems which are normally carried out by ground works specialists together with suitably qualified and experienced underground drainage specialists, and are not included in this specification.

All works shall comply with the current Building Regulations Part H and appropriate BSI Codes of Practice which include BS EN 12056-1 to 5 inclusive and BS 8000 – 13: 1989. Reference may also be made to the current Edition of the I.O.P Guide. All works carried out shall also comply with any local water authorities requirements. Royal Holloway University of London shall also be fully informed of all works by issuing the appropriate method statements.

This specification should be read in conjunction with the Health and Safety Specification (No 1) and available from Royal Holloway University of London.

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

**HEALTH AND SAFETY STATEMENT**

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

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

The Health and Safety Executive (HSE) publish a series of guidance documents regarding all many different methods of protecting the workforce and people in general when working with hazardous chemicals (COSH) and undertaking potential dangerous work activities.

Installers engaged in any work shall be registered with the Construction Skills Certificate Scheme (CSCS) and be in possession of a valid skills card.
9.2 **GENERAL**

Prior to commencing work the Installer shall satisfy himself that he is fully conversant with the requirements of Royal Holloway University of London and that the works can be installed properly making provision for all maintenance works that may be required such as access to rodding eyes and that the correct falls of drainage pipework can be accommodated. Gradient of 2½° shall be as the standard unless otherwise stated. Alternative materials such as heavyweight (HW) cast iron, lightweight (LW) cast iron, MuPVC may be used as detailed in this document subject to the application and requirements of Royal Holloway University of London.

9.2.1 **Pipework Installation**

This section of the specification describes the minimum standards and workmanship expected from the Installer by Royal Holloway University of London.

9.2.1.1 **Joints**

Shall be assembled to comply with the manufacturer’s site work instructions, if required, using a lubricant/solvent as recommended by the Manufacturer. No other type shall be used. Solvent welded fittings shall be kept to a minimum and suitable Boss pipes with pre-formed upstands and Boss socket adapters shall be used for waste pipe take-offs and where possible, assembled by the Manufacturer. Solvent patch or strap-on Boss pieces shall not be used. Only proprietary Boss branches shall be accepted.

Where the vertical stacks meet the ground drain, the pipe shall be entered into the drain socket and jointed with an agreed coupling.

9.2.1.2 **Supports**

All pipes shall be fixed using the recommended type of bracket and where necessary, purpose made brackets shall be manufactured from mild steel flat bar or angle iron of an appropriate weight and girth. An insert piece of suitable material shall be placed between bracket and pipe and the bracket shall be secured to the structure with the recommended type of fixing.

Drop rods shall be made of screwed mild steel bar of an appropriate diameter and shall be fixed to the structure with an agreed type of fixing. Vertical pipes shall be supported where they pass through floors with the recommended type of weight support bracket, intermediate brackets to give lateral support shall be provided. All sanitation pipework shall be supported at intervals not less than those stated in Table NF1 of BSEN12056.

Ensign pipework is to be supported at joints, one bracket per 2 metre length and two brackets per 3 metre length at 1.5 metre intervals. Stabilisation brackets shall be provided at all junctions and changes of direction.

All brackets/fixings shall be secured to the building structure and not onto the face of plastered walls.

The Installer must not cut, drill or weld to any structural member without the written agreement of the Structural Engineer and Royal Holloway University of London.

Horizontal pipes shall be supported with the recommended type of bracket so as to provide for weight support, and lateral stress, these shall be spaced at no more than 2m centres.
9.2.1.3 Expansion

Expansion joints shall be provided as required to relieve thermal movement. Any point where a pipe is made good or fire stopped when passing through a wall or floor must be treated as a fixed point when arranging the position of expansion joints but should not be relied on to anchor the pipe.

9.2.1.4 Sleeves

Where pipes pass through walls or floors, sleeves of plastic, sheet metal or mild steel, depending on the service, shall be provided, and shall be designed so as to leave an annular space which shall be suitably fire stopped with mineral/fibre quilt type rope so as to satisfy Fire Regulations and provide proof against vermin.

Where PVC pipework 50mm and above pass through a fire compartmented area an intumescent sleeve or collar shall be provided to maintain the compartments integrity.

Sleeves shall not be used as supports for the pipes and pipes shall be fixed clear of sleeves at all points.

Sleeves shall be of sufficient length to be clear of the building structure, except for floor or ground sleeves which shall have a 100mm (4”) upstand, where fitted in rooms likely to be hosed down.

9.2.1.5 Access

Access pipes and large radius bends shall be provided at the foot of all vertical stacks and at points as indicated on the drawings so as to facilitate easy access for cleaning and testing. Access shall be provided on each floor level positioned above the spill-over level of the lowest appliances connected to that stack.

Waste pipe runs serving more than one fitment shall be provided with means of clearance at their extreme end.

Access shall also be provided at floor level for each unventilated branch run from the main ground drain where vent stacks rising from ground drainage reduce such reduction shall be after the access pipe.

Access shall be deemed to be provided where on the lowest floor in each area the drain reducing to 32 > 50 PVC, etc. serving unventilated units has:

(a) The reducing fitting at floor level.
(b) The small diameter waste piping demountable.
(c) Ready means of removing and reinstating the reducing piece therefore giving direct full size access to the below floor drain run.

9.2.1.6 Wall, Floor and Ceiling Masking Plates

Masking plates shall be provided in all exposed penetrations of walls, floors and ceilings. Type Chromium plated copper alloy. Split on the diameter, close fitting to the outside of the pipe. Fixing shall be with chrome raised head fixing screws.
9.2.1.7 Vent Pipe Terminations

Ventilation pipes to terminate through roof with copper wire balloons or suitable vent cowls. Where appropriate a weathering slate shall be incorporated.

9.2.1.8 Open Ends

All open ends shall be suitably sealed during the course of the works against the ingress of foreign building matter.

9.2.1.9 Sanitary Ware

The Installer where required shall accept as free issue from the client (Royal Holloway University of London) or client representations any sanitary ware and install the appliances in strict accordance with the selected manufacturers’ requirements and any prevailing local regulations.

The Installer may also be requested to purchase sanitary ware on behalf of Royal Holloway University of London as specified.

The sanitary ware shall be suitably protected at all times. Basins, toilet pans and the like shall also be covered so as to avoid the ingress of any site building materials during the construction works.

9.2.2 Pipework And Fittings

The Installer shall be competent in the supply and installation of the following materials as applied to conventional above ground waste and ventilation pipework. However, there may be specialist applications where drainage from chemical sources (fume cupboards, laboratory sinks etc) may be required which may require guidance from Royal Holloway University of London.

9.2.2.1 Lightweight (LW) Cast Iron Pipework and Fittings

Soil, waste and ventilating pipes and fittings shall be of the lightweight cast iron to BSEN877 and ISO6594 ‘above ground’ as St. Gobain Pipelines ‘Ensign’ or similar agreed. Couplings will be fitted with electrical continuity clips within each joint.

All couplings and fittings are to be fitted in accordance with manufacturer’s recommendations and tightened by torque as listed in the manufacturer’s catalogue.

9.2.2.2 PVCu Pipework and Fittings

Soil, waste and ventilating pipes and fittings shall be manufactured of PVCu to BS4514 with either neoprene ring joints or solvent welded.

9.2.2.3 Waste Pipes

Small diameter waste pipes and fittings shall be in MuPVC to BS5255 as manufactured by Polypipe, Marley or similar agreed. Traps shall be in Polypropylene to BS3943, 3” seal tubular type, all as manufactured by McAlpine & Co, Glasgow with mechanical joint system or other equal.

Gradients for waste pipework shall be 2½° as standard unless noted otherwise.
9.2.2.4 Chemical Drainage

Drainage systems dealing with chemical waste shall be installed in Vulcathene as manufactured by Durapipe Ltd who provide a detailed product specification.

This specification has been incorporated herein to assist the Installer who shall also obtain confirmatory details from the manufacturer.

The Installer shall also ensure that any works carried out are fully agreed by Royal Holloway University of London in connection with the specific project involved.

**Product Specification - Vulcathene System**

*As Supplied by Durapipe Ltd*

**MATCHED SYSTEM**

The integrity of the Vulcathene Chemical Waste System and the manufacturer’s warranties may be compromised if materials from various manufacturers are installed as one system. The system shall therefore, be manufactured by a single supplier to ensure that a uniform continuity of quality and chemical resistance is maintained throughout.

**MATERIAL**

Pipes, fittings and fittings to be manufactured from black co-polymer polypropylene

All fittings to be injection moulded using virgin material.

**QUALITY**

Pipes and fittings to be manufactured in an environment which operates a Quality Assurance System assessed to ISO 9001.

**STANDARDS**

The system shall be manufactured to conform with the requirements of British Board of Agreement (BBA) certificate number 92/2805.

**METHOD OF JOINTING**

The Vulcathene system offers a choice of mechanical or welded joints, the Vulcathene pipe being common to both methods.

Mechanical – the mechanical system incorporates an olive located in a groove cut into the outer wall of the pipe by means of a Vulcathene grooving tool. This method of jointing is often specified for use under work-benches where its demountability offers ease of maintenance.

Welded – the Enfusion system provides a permanent electrofusion welded joints, ideal for use in ceiling voids, vertical stacks and underground pipework.

**INSTALLATION PROCEDURE**

Jointing Method -

All joints to sinks and under benches to be of the demountable mechanical compression type and to include an olive seal located into a groove cut into the outer wall of the pipe by means of a Vulcathene grooving tool.
For pipes and fittings used in ceiling voids, vertical stacks and underground the system should be of the Enfusion type and permanently sealed except for fittings allowing for expansion.

**DESIGN & INSTALLATION SPECIFICATION**

The installation must be carried out by competent persons.

The contractor shall be required to provide technical documentation relating to the manufacturers recommended Design and Installation procedures.

The manufacturer shall publish Design and Installation instructions, and shall also provide a free-of-charge training service for designers and installers, with appropriate written confirmation of attendance.

**Specific attention shall be paid to the following:**

**Traps** - All traps should be of the anti-siphon type, based on the GREVAC design. The GREVAC type anti-siphon trap with a borosilicate glass based should be used when particularly strong chemical solutions are to be conveyed.

**Pipe Fall** - Horizontal waste runs should be installed to provide a natural fall to the vertical stack. Such a fall is dictated to some extent by the particular installation. 2° is an ‘ideal’ fall but in any event it should never be less than 1°.

**Pipe Support** - Vulcathene pipe does not require continuous support when used for horizontal runs in ambient room temperatures; Vulcathene pipe clips should be fixed at the following recommended centres:

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>Fixing Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>38mm</td>
<td>1.22m</td>
</tr>
<tr>
<td>51mm</td>
<td>1.37m</td>
</tr>
<tr>
<td>76mm</td>
<td>1.52m</td>
</tr>
<tr>
<td>102mm</td>
<td>1.83m</td>
</tr>
<tr>
<td>152mm</td>
<td>1.83m</td>
</tr>
</tbody>
</table>

Horizontal pipe runs, where sustained temperatures in excess of 40°C (104°F) are expected, should have continuous support using lightweight galvanised metal channel.

Vertical pipes, regardless of size, should be fixed at 1.5m centres using Vulcathene pipe clips which retain the pipe securely whilst, at the same time, allowing lateral movement of the pipe caused by fluctuations in thermal conditions.

When 76mm or 102mm pipe is installed in vertical runs of some length, however, thermal movement may cause considerable strain. In such conditions metal straps should be used to retain the pipe.

Where pipework is to be suspended the use of metal hangers is recommended.

**System Ventilation** - Vulcathene Air Admittance Valves should be installed where stacks are to be terminated inside the building. Air Admittance valves prevent the release of foul air whilst admitting air under conditions of reduced pressure in discharge pipes.

**Fire Protection** - Vulcathene pipes which pass through fire rated walls and floors should be fire protected with Unicollar intumescent fire protection collars.

**Repair (Clamp) Saddles** - To enable easy connection of new branch pipes to existing Vulcathene stacks use Vulcathene clamp saddles.
Thermal Expansion - To overcome the problem of expansion and contraction of pipework brought about by changing temperatures, Vulcathene Thermal Stress Relief Units (SRU) can be installed.

When an SRU is installed care should be taken in the fixing of the pipe to ensure an accurate linear ‘thrust and pull’ movement. Any form of pipe clip used, therefore, should not grip the pipe tightly, but should allow the pipe to slide freely without any tendency to buckle. The housing of the SRU, however, should always be firmly anchored, allowing the sliding member to accept all movement.

System Testing - The system should be inspected for leaks in accordance with BS EN 12056. Air should be pumped into the system, one floor at a time, through a branch of a tee until a pressure equal to 38mm water gauge is achieved. The inlet valve should then be closed and the system should maintain the pressure for a minimum of three minutes.

9.2.3 Testing Generally

The complete installation shall be tested to the satisfaction and in the presence of the Environmental Health/Building Control Officer. The test shall be as follows:

- Check that all sections of installation are securely fixed and free from obstruction and debris.
- Carry out tests as specified. After testing, locate and remedy all defects without delay and retest as instructed. Do not use smoke to trace leaks.
- The Installer shall supply Test Certificates to show that equipment and materials and installations have been tested in accordance with the specified requirements. The certificate signed by the Contractor shall indicate: (1) the apparatus/service under test, (2) test pressure. (3) duration. Generalised descriptions of the area tested will be rejected.
- The Installer shall be responsible for the complete commissioning of the works to the satisfaction of the Environmental Health/Building Control Officer and Royal Holloway University of London and shall leave the works in correct working order.
- The Installer shall regulate all services installed or connected.
- Apply to all internal pipework prior to concealment behind cladding/boxing-in.
- Temporarily plug or cap off outlets.
- Using a pump with suitable gauge, introduce air to a pressure of 200m bar (2m head of water equivalent).
- Allow a period of temperature stabilisation, after which pressure to be maintained, without loss, for not less than five minutes.
9.2.3.1 Soil, Waste Pipework Final Test

Temporarily seal open ends of pipework with plugs

Connect a 'U' tube water gauge and air pump to the pipework via a plug or through the trap of an appliance

Pump air into pipework until gauge registers 38mm.

Allow a period for temperature stabilisation, after which the pressure of 38mm is to be maintained without loss for not less than 3 minutes.

9.2.3.2 Siphonage and Back Pressure Tests

Test WC pans by flushing and test other appliances by filling to overflow level, then removing the plug

Carry out tests at least three times with traps recharged before each test

Test each appliance individually for self siphonage, then test for induced siphonage and back pressure by discharging appliances simultaneously on each stack.