Installation data

Pipe laying

The following information is based on the recommendations in BS 5955: Part 6 ‘Installation of PVCu pipework for gravity drains and sewers’ and BS EN 1610 ‘Construction and testing of drains and sewers’ and is intended as a general guide to good practice in the selection of bedding and backfill materials for Marley solid wall and Quantum underground drainage systems.

Excavation

Trenches should not be open for extended periods in advance of pipe laying and should be backfilled as soon as possible. It is essential that the sides of the trench are adequately supported during pipe laying. Trench widths should be as narrow as is practicable but not less than the pipe diameter plus 300mm to allow adequate sidefill to be placed. Deeper excavations should ideally incorporate a sub-trench in accordance with the diagram below.

Granular material for bed & surround of PVCu drains and sewers

Suitable imported granular material for bedding and surrounding PVCu solid wall and Quantum pipes for private and adoptable sewer applications is detailed in the table below:

Grading complying with the requirements of BS EN 1610. Granular material also includes aggregates for concrete to BS EN 12620.

<table>
<thead>
<tr>
<th>Nominal pipe size</th>
<th>Granular material size</th>
</tr>
</thead>
<tbody>
<tr>
<td>100/110mm</td>
<td>10mm nominal single-size</td>
</tr>
<tr>
<td></td>
<td>14 to 5mm course graded</td>
</tr>
<tr>
<td>150/160mm</td>
<td>10 or 14mm nominal single-size</td>
</tr>
<tr>
<td></td>
<td>14 to 5mm course graded</td>
</tr>
<tr>
<td>150/225mm and over</td>
<td>10, 14 or 20mm nominal single-size</td>
</tr>
<tr>
<td></td>
<td>14 or 20 to 5mm course graded</td>
</tr>
</tbody>
</table>

Bedding & backfill

Where the as-dug material is suitable*, the bottom of the trench may be trimmed to form the pipe bed and the as-dug soil used as sidefill and backfill in accordance with BS EN 1610 bedding construction type B (see drawing below).

Where the as-dug material is unsuitable as bed and surround, installation should be carried out in accordance with BS EN 1610 bedding construction type 1, as shown below.

Trenches should be excavated to allow for the depth of bedding material. Before any pipework is installed the bedding material should be laid evenly along the bottom of the trench.

The sidefill material must be the same as the bedding material and extended to the crown of the pipe and be thoroughly compacted.

Where the backfill above the pipe contains stones larger than 40mm or where the pipework is deeper than 2m in poor ground, the granular material must extend at least 100mm above the pipe crown. Alternatively, backfill material can be graded to eliminate stones exceeding 40mm and this selected material used for the first 300mm above the pipe.

When the pipes are to be laid in rock, compacted sand or gravel, or in very soft or wet ground requiring mechanical means of trimming, the bedding should be a minimum of 100mm.

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*Suitable material is defined as material in accordance with the recommendations of BS 5955: Part 6: 1980 Appendix A, having a maximum particle size not exceeding 20mm.
Installation data

Pipe laying

It is important to ensure that the ground is prepared correctly and that suitable bedding and backfill material is used, depending on the soil type and the loading required.

Shallow domestic drains

Pipes laid at depths less than 600mm and which are not under a road should, where necessary, be protected against damage by placing over them a layer of concrete, paving slabs or similar. A minimum 75mm cushioning layer of granular material must be laid between pipes and the slabs or concrete.

Where drains are laid in fields, additional protection may be required from heavy vehicles and equipment. It is recommended that the installation is carried out with a concrete slab spanning the trench as shown for drains under private roads (on opposite page below).

Drains under solid ground floors

Drains often have to be laid under buildings in order to connect sanitary pipework which has been positioned some distance from the outer walls. Where this occurs, deep hardcore within the foundation boundaries should be compacted first. The trench for the pipe should then be excavated and suitable material employed for the bedding and backfilling operation. If trenches are dug from original ground, pipes may be laid and surrounded as necessary before the top layer of hardcore is formed. Where a pipe passes through a wall or foundation of a building, a lintel or sleeve should be built-in to provide clearance around the pipe.

Concrete bed & surround

The flexible nature of PVCu pipes enables them to accommodate ground movement and other differential settlement that may occur under normal conditions. Therefore, the use of concrete bed and surround is not recommended and only under special circumstances, at very shallow cover depths or where it is necessary to safeguard foundations, should it be used. Where the use of concrete bed and surround is unavoidable, it is recommended that pipes are laid in 3 metre lengths and a compressible board is shaped to fit around each joint. Pipes should also be wrapped with polythene to prevent the ingress of cement slurry into ring seal joints.

Drains under private roads

If the depth of cover under a road or driveway is less than 0.9m, a concrete slab spanning the trench width is required.

Adoptable sewers under roads

For adoptable sewer applications pipe bedding details should be in accordance with the Water Industry Specification. Selected as-dug material may be used for bedding and sidefill provided it meets the evaluation procedure and compaction fraction test values specified in WIS 4-08-01. The minimum cover under public roads should be 1.2m to the top of the pipe. The above information is for general guidance only and detailed proposals with regard to bedding and sidefill materials for sewers must be submitted to the relevant Adopting Authority for formal approval at the design stage of the project.

Shallow domestic drains

Drains under solid ground floors

Concrete bed & surround

Drains under private roads

Adoptable sewers under roads