SEWERAGE / DRAINAGE

FlowLine

PVC-U

THE COMPLETE UNDERGROUND PVC-U SEWER PIPE SYSTEM

ISO 9001 SGS · ISO 14001 SGS · OHSAS 18001 SGS · Pakistan Standards · wavin CONNECT TO BETTER · DADEX

Introduction

Flowline piping system is a suitable solution for underground drain and sewer applications in homes, commercial plazas, community buildings and infrastructure projects. This easy push-fit rubber ring/solvent cement jointing system is durable, corrosion free and lightweight. Flowline is the first PVC-U based underground sewer pipe system in Pakistan that conforms to international quality standards.

Material

Flowline pipe system is manufactured from Unplasticised Polyvinyl Chloride (PVC-U) compound.
Flowline pipes and fittings are terra cotta (orange brown) in colour, which is recommended colour for buried drainage system.

Standards and Specifications

Flowline pipes and fittings are manufactured in accordance with EN 1401-1.

Available Range

Flowline pipes and fittings are available from 110mm to 400mm in standard lengths of 3 & 4 meters. A range of imported injection molded fittings could be made available.

Nominal Outside Diameter (mm)	Mean Outside Diameter min-max (mm)	Min Wall Thickness (mm) SN 8, (SDR 34)	Min Wall Thickness (mm) SN 4, (SDR 41)
110	110.0 - 110.3	3.2	3.2
160	160.0 - 160.4	4.7	4.0
200	200.0 - 200.5	5.9	4.9
250	250.0 - 250.5	7.3	6.2
315	315.0 - 315.6	9.2	7.7
355	355.0 - 355.7	10.4	8.7
400	400.0 - 400.7	11.7	9.8

(Wall thickness and outside diameter refer to pipes only)

Features & Benefits

- **Efficient Disposal:** Exceptionally low friction and smooth inside surface of Flowline minimizes the build up of deposits commonly seen in conventional sewer pipe systems.
- **Low Bacterial Growth:** All conventional sewer pipes collect a coating of algae or slime. Flowline offers lesser grips for slime.
- **Thermal Expansion/Contraction:** Flowline pipe system with rubber ring socket joint allows natural provisions against thermal expansion.
- **Non Corrosiveness and chemical Resistance:** One of the most remarkable features of Flowline is its non-corrosiveness. It resists chemical reactions from acids, alkalis and salt solutions.
- **Lightweight and Easy to install:** Flowline pipes are light weight and easy to install. This leads to lower transportation and installation costs.
- **Leak Free:** Flowline has water tight connections. There is no chance of infiltration or pollution of ground water.
- **Easy to Maintain:** Flowline pipe systems are easy to access after installation for inspection, cleaning, repairs, etc.

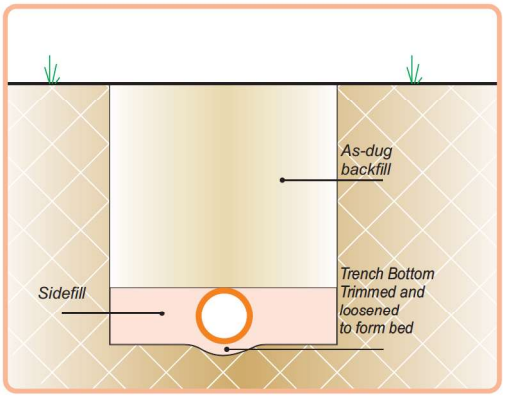
Laying & Installation

The following information is based on the recommendations of BS 5955 part 6 "code of Practice for installation of UPVC pipe work for gravity drainage & sewer"
BS EN 1610 "Construction and testing of drains and sewers"

Bedding

A. Drain pipes laid on trench bottom

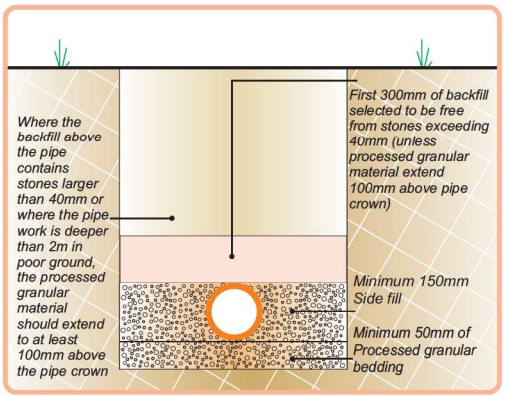
Where the 'as-dug' material is suitable*, the bottom of the trench may be trimmed to form the pipe bed.
*Suitable material is defined as granular material.
Small depressions should be made to accommodate sockets. After the pipe has been laid these should be filled carefully ensuring that no voids remain under, or around the sockets.
When the formation is prepared, the pipes should be laid upon it true to line and level within the specified tolerances. Each pipe should be checked and any necessary adjustments to level made by raising or lowering the formation, ensuring that the pipes finally rest evenly on the adjusted formation throughout the length of the barrels. Adjustment should never be made by local packing.



A - Pipe Laid on Trench Bottom

B. Drain pipes laid on a 50mm minimum granular bed

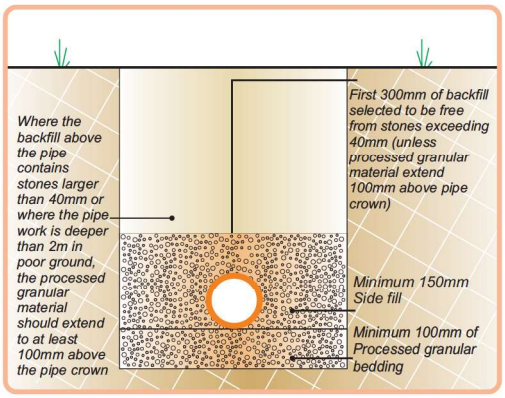
When the as-dug material can be hand trimmed by shovel and is not puddled when walked upon, a 50mm depth of bedding material may be used. In this case the material must be nominal 5 to 9mm size aggregate with no sharp edges, i.e. Pea gravel.



B - Pipes on 50mm Granular Bed

C. Drain pipes laid on a 100mm minimum granular bed

When the as-dug material is not suitable as a bedding, a layer of suitable granular material must be spread evenly on the trimmed trench bottom before the pipes are installed.
The trench should be excavated to allow for a minimum thickness of 100mm granular bedding under the pipes. The trench formation should be prepared, the bedding placed and the pipes laid in accordance with recommended practices.
When the pipes are to be laid on rock, compacted sand or gravel should be used, or in very soft or wet ground, the bedding should be as detailed above.



C - Pipes on 100mm Granular Bed

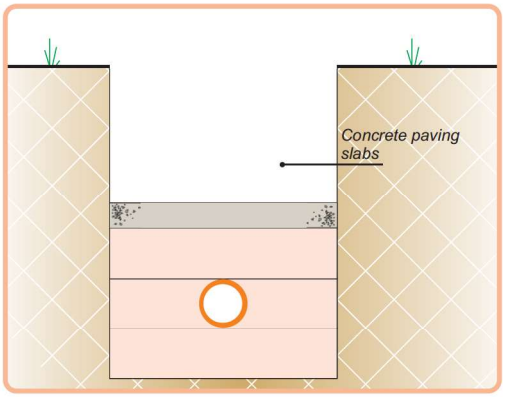
Backfill Sequence

- Place suitable sidefill material evenly on each side of the pipe in 100mm layers. Pay particular attention to the area under the lower quadrants of the pipe. Hand tamp well at each layer up to the pipe crown. Leave the pipe crown exposed.
- If 'as-dug' material is free from stones exceeding 40mm, imported processed granular material is not needed above the pipe crown. Cover the pipe crown with a minimum of 300mm of compacted 'as-dug' material. If 'as-dug' material contains stones larger than 40mm, or the pipe is deeper than 2 metres in poor ground, extend the processed granular material for at least 100mm above the pipe crown.

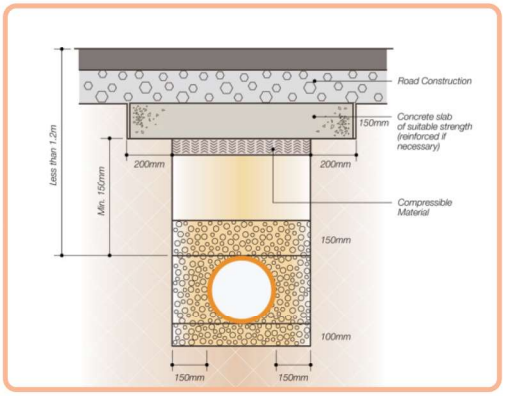
- In both cases, hand tamp the material fully at the sides of the pipe while tamping lightly over the crown. Continue hand tamping until a finished layer of 300mm, (225mm in adoptable situations), has been placed over the pipe.
- 'As-dug' material may be backfilled in 300mm/225mm layers and mechanically tamped. Dumpers or other vehicles must not be driven along the pipe tracks as a means of compacting. Surround vertical or steeply raking pipes with 150mm bedding material, suitably tamped up to the invert level of the incoming pipe (Backdrops) or to ground level.

Pipe Protection

As PVC-U pipes are flexible they can accommodate a degree of ground movement and pressure without damage. However, if the pipe needs protection the following recommendations should be followed:

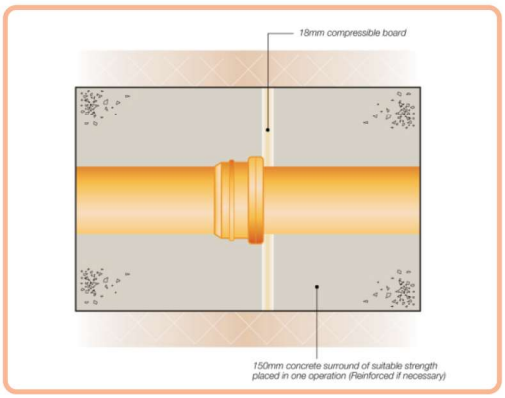


Traffic Free Area: In areas where no loading is expected (e.g. In gardens) pipes at depths less than 0.6 metre, should, where necessary, be protected against risk of damage from garden implements, for example by placing over them a layer of concrete paving slabs with at least a 75mm layer of suitable material between pipe and slab.



Public highways / adoptable situations: In areas where loading is expected, pipes laid at depths less than 0.9 metre below the finished surface of a road, (1.2m in adoptable situations) should be protected with a concrete slab of suitable strength which should bridge the full width of the trench so it sits on the trench wall. or, alternatively the pipe can be totally surrounded in concrete. Concrete of suitable strength or the requirement for reinforced concrete to be determined by the engineer or adopting authority. The normal maximum depth for all installations is 10 metres.

Use of concrete: If pipes are to be surrounded with concrete, make sure they do not float when the concrete is poured. Filling the pipes with water will generally provide enough ballast but side restraint may be needed to maintain alignment.
To maintain certain degree of flexibility, insert 18mm compressible material, such as fibreboard or polystyrene, around the pipe joints. These boards must be at least the width of the concrete surrounds.

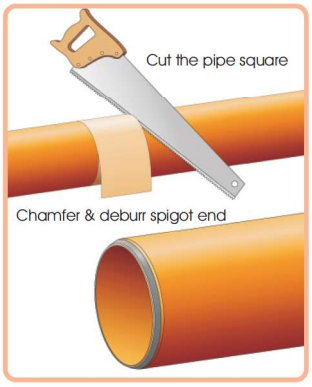


Pipes under buildings: A drain may run under a building if at least 100mm of granular or other flexible filling is provided round the pipe. On sites where excessive subsidence is possible additional flexible joints may be advisable or other solutions such as suspended drainage. Where ground settlement is expected and the crown of the pipe is within 300mm of the underside of the slab, concrete encasement should be used integral with the slab.

Pipes penetrating walls: Where a short length of pipe is to be built into a structure, a suitable wall protection sleeve should be used. The short length of pipe should then be inserted throw the wall protection sleeve, and fixed with couplers placed either side within 150mm from the wall face. The length of the next 'rocker' pipe should not exceed 0.6 metre. This will compensate for any settlement of the building or made up ground.
Alternatively, where it is not necessary for a pipe to be built into a structure, the provision of a lintel, relieving arch

or sleeve may be used, leaving a gap of not less than 50mm around the pipe. Effective means should be adopted to prevent the entry of gravel, rodents or grasses.

Pipe Cutting and Jointing

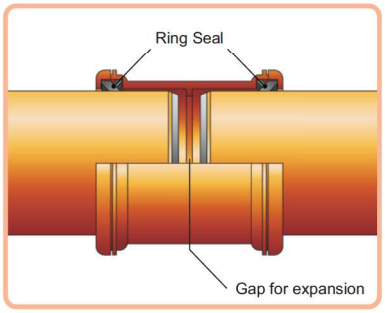


Preparing Pipe Ends

Pipes cut on site must be clean cut at right angles to their horizontal axis.
De-burr the cut end with a scraper if the cut end is to be inserted into a ring-seal or push-fit joint. Chamfer the spigot end: this is essential to ensure that the sealing ring is not displaced during insertion.

Depth of Entry Mark

Some plain ended fittings have a depth of entry mark moulded on the spigot. This depth of entry allows the pipe to expand into the fitting socket by a minimum of 12mm. Insert the spigot into the socket until the depth of entry mark is just visible. All pipes (whether site cut or otherwise) and other plain ended fittings must be inserted to the full depth of the socket, marked at the socket face and then withdrawn at least 12mm.



Ring-Seal / Push-Fit Jointing

- Ensure any pipe cut on site is also chamfered.
- Check that the sealing ring is properly seated in its housing in the socket of the fitting.
- Ensure all components to be joined are dry, clean and free from grit or dust. Note any deep scratches on the pipe or fitting spigot as these may prevent the sealing ring from forming a water tight seal.
- Lubricate evenly around the pipe or fitting spigot end with Silicone Lubricant. Do NOT lubricate inside the socket and not the ring seal. The spigot can then be inserted into the socket. Use of washing liquid is not recommended as lubricant. However, soap solution can be used as lubricant.
- Correctly align the components to be joined.
- Push the pipe or fitting spigot fully into the socket. Mark the pipe or fitting spigot at the socket face and then withdraw it by a minimum of 12mm to allow for thermal expansion.
- Make a subsequent check to ensure that the expansion gap is not lost during further installation work.

Solvent Cement Jointing

- Before using solvent based cleaners or cement:
  - Read instructions on the can
  - Ensure there is sufficient ventilation.
- Make sure pipe or fitting spigot and solvent weld socket are dry, clean and free from grit or dust.
- Clean surfaces of spigot and socket with Dadex Degreasing Cleaner. Apply liberally using a clean non synthetic rag or absorbent paper.
- Apply one coat of Dadex Solvent Cement. Apply an even coat to both surfaces using the applicator provided or a paint brush. Stroke the cement along and not around the surfaces.
- Immediately insert pipe or fitting spigot fully into the socket. Each solvent weld joint MUST be completed within 1½ minutes.
- Hold for 20-30 seconds. Remove any surplus cement from the mouth of the socket.
- The joint may be handled after 10 minutes and commissioned after 24 hours.

Safety

When making solvent weld joints it is essential to observe normal safety rules for handling solvent:

- Never smoke or bring naked flames near the area of work
- Work in a well ventilated area to avoid inhaling fumes
- Close the solvent container after use and store in a cool area

- Do not allow solvents or cleaners to come into contact with skin.

Refer to COSHH Regulations (Control of Substances Hazardous to Health) and local safety regulations where applicable.

Transport

Generally pipes are delivered on flat bed trucks.

- When vehicles with a flat bed are used for transporting loose pipes, make sure the bed is free of nails and other projections.
- Support pipes throughout their length. Load pipes so that they do not overhang the vehicle by more than one meter.
- Always load pipes with larger diameters and thicker walls before those of smaller diameters and thinner walls. Flowline pipes should always be lifted off the vehicle, not dragged, thus avoiding damage to the pipe ends. Make sure vehicles have adequate side supports at approximately 2 metre spacings, and that all uprights are flat, with no sharp edges. Secure pipes during transit.
- Fittings are supplied in cardboard boxes or plastic bags.

Handling

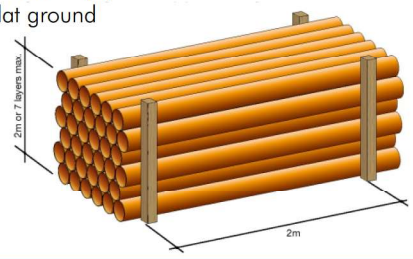
Always be careful to avoid damage when handling pipe. Cold weather reduces their impact strength, so take extra care when handling pipe in cold conditions.
Load and unload loose pipes by hand and avoid using skids. When loose pipes have been transported one inside the other, always remove the inner pipes first.
Do not drop or drag pipes.

Storage

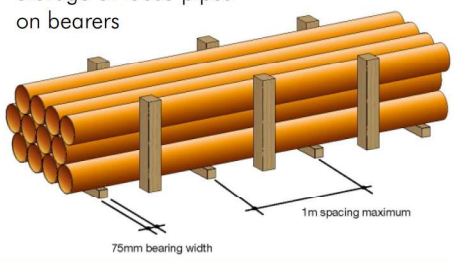
Loose Pipes

Store loose pipes on a reasonably flat surface free of sharp projections. Provide side supports at least every 2 metres. These supports should preferably consist of battens at least 75mm wide.
Ideally, loose pipes should be uniformly supported throughout their entire length. If this is not possible, place timber supports at least 75mm wide at 1 metre maximum centres beneath the pipes.
Stack pipes of different size and wall thickness separately. If this is not possible, stack pipes with larger diameters and thicker walls under those with smaller diameters and thinner walls.
Do not stack pipes more than seven layers in height or above a maximum height of 2 metres.

Storage of loose pipes on the flat ground



Storage of loose pipes on bearers



Fittings

Store fittings supplied in plastic bags away from direct sunlight.
If fittings have to be stored outside in their plastic bags, open the bags to prevent a build-up of temperature.
The above storage requirements apply to the normal climatic conditions. In hot areas reduce the stack height and store pipes and fittings under cover or in the shade.

Rubber Seal Rings

Make sure that rubber seal rings are kept in polyethylene bags or cartons in shade away from direct sunlight.

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