

► INSTALLATION GUIDE

Installation is an important factor for long lasting performance. TEPPFA is thus preparing an installation guide for plastic sewer pipes. The guide that is previewed here is being developed in two stages: firstly a leaflet explaining briefly good and bad workmanship in the trench and secondly, a small booklet to serve as an additional guide with background information.

The guide was born out of a need to communicate the correct and recognised installation methods for the performance required from plastic sewer pipe systems. Henk Meerman who is leading the TEPPFA team on the project explains: "In principle, municipalities, water companies and installers throughout Europe should all benefit from the recommendations. Clearly the Europe Union has become larger and this has provided a more receptive platform for sharing best practices."

Storage

There are ten sections to the guide. The first deals with storage with advice for example to avoid direct sunlight for pipes stored in the open for more than six months. The pipes should not be stored vertically but instead, stored horizontally on battens with side supports at intervals of maximum 2 metres.

Transport & Handling

Transport and handling are often a source of damage and therefore neither metal slings nor chains are recommended for unloading. Forklifts or web slings are proposed and then with nylon strings or ropes only. There should be no dropping and certainly no dragging of pipes across the ground. Furthermore, pipes and their components should be inspected on delivery to ensure that they comply to design requirements.

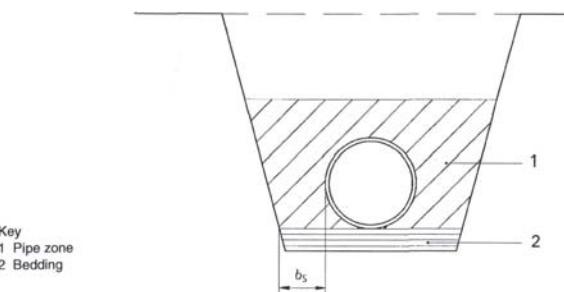


Henk Meerman



Trench conditions

TEPPFA has undertaken many studies and tests to identify the correct conditions for installation within the trench. For example, excavated material should be transported to at least 0, 5 m of the edge of the trench.



Nominal size DN	b_s mm
$DN \leq 300$	200
$300 < DN \leq 900$	300
$900 < DN \leq 1600$	400
$1600 < DN \leq 2400$	600
$2400 < DN \leq 3000$	900

At least 100 – 150 mm should be allowed below the base of the pipe (minimum 50mm). Note the width beside the pipe (b_s) and the fact that a depth cover of at least 600 mm is recommended.

Bedding

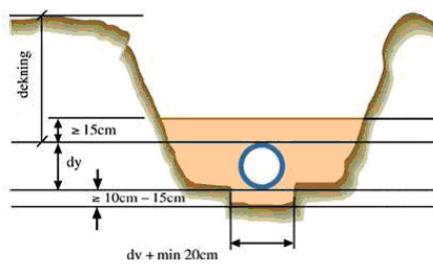
Bedding must fully support pipeline base. For special bedding conditions, gradual bedding or crest rock is proposed. Primary backfill should be laid beside the pipe and secondary backfill provided for pipe diameters of over 700 mm.



Compaction

Flexible pipes deflect under load and can be deflected to a high degree without fracture. The level of deflection reached by a buried pipe depends on the properties of the surrounding material and to a much lesser extent on the stiffness of the pipe but not on its strength properties. To minimize both initial and final deflections backfilling and compaction conditions of the surrounding soils are very important

Generally the choice of pipe stiffness depends upon the native soil, the pipe zone backfill and its compaction, the depth of the cover and the loading conditions.



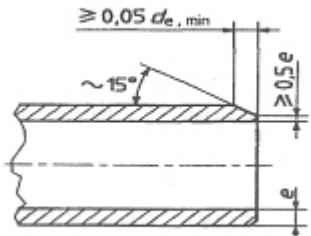
Pipe cutting

A handsaw is advised and to cut midway between ribs/corrugations (where relevant). The saw must be kept square to the pipe: a newspaper is suggested to ensure perpendicular cutting. In practice, the pipe end should also be supported during cutting. The pipe should then be cleaned and any burrs removed. Holes for the saddles can then be drilled and the pipe ends chamfered.



Chamfering

For rubber ring joints, pipes with a smooth outside surface must be chamfered (see below and opposite).



Jointing

A fair part of the guide is given over to the various methods of jointing. Basic advice refers to following the manufacturer's guidelines. Rings should not be forgotten – sounds simple, but it does happen! There are also some instructions for removing dirt and debris from pipe ends and sockets as well as lubricating inner surfaces of socket and ring seals.



Cold bending on site

Plastic piping systems have a degree of flexibility. The allowed radius of curvature varies with the pipe material and the pipe diameter. As a guidance the values in the table may be used.

Diameter (mm)	Curvature in PVC-U (R)	Curvature in PE / PP (R)
= < 160	300 * diameter	75 * diameter
200 = < diameter < 355	400 * diameter	100* diameter
>= 400	500 * diameter	100* diameter

Testing

Visual inspection involves CCTV, mirror check from manhole to manhole, line and level, joints, damage or deformation, connections, etc. With regards to leak-tightness, inspection chambers and manholes should be conducted before any side fill is placed. Preference is expressed for testing with the water method. Air testing of inspection chambers and manholes is difficult and special precautions and care are required for safety reasons.

The test pressure advised is equivalent to or resulting from filling the test section up to the ground level of the downstream or upstream manhole (as appropriate) with a maximum pressure of 50 kPa and a minimum pressure of 10 kPa measured at the top of the pipe!

However, higher test pressures may be specified for pipelines that are designed to operate under permanent or temporary surcharge. Having filled the pipeline, one hour may be needed for conditioning - depending on local situations.



Testing time amounts to over 30 minutes with the requirement that there is no leakage unless otherwise specified.

Pressure pipelines shall be tested by $1.5 * \text{PN}$ (nominal pressure) as required by the specifier.

Henk Meerman says that the guidelines should be published by the end of this year and will contain annexes for recycling properties, normative references and further guidelines with lessons learned from practical experience.

