

► FOR THE RECORD...

Brussels. Some rather inconsistent information is told about the nature of non-plastic pipes and the nature of plastic pipe systems. Tiem Meijering, technical manager of TEPPFA has a few convincing arguments of his own that he would like to share...

Some experts estimate that plastics conversion for pipe systems is running at about 6.5% per annum. For instance, Central Eastern Europe is converting rapidly to the benefits of modern plastic pipe technology.

The arguments for plastic pipes continue to remain relevant and worth considering if only to reflect on why plastic pipes continue to prove so successful.

DURABILITY

When properly installed, the physical and chemical stability of all plastics materials for piping systems show such a high level that all these materials can last much more than 100 years.

DIVERSITY

The variety of plastic pipe products is the result of market demands. The versatility of plastics is such that they are able to serve the market with different solutions. Most of the available plastics piping solutions are tailor made for different applications (e.g. sewer, road drainage, rainwater etc.) with different sets of preferences and requirements - which are basically determined by the wishes and demands of the users.



Tiem Meijering

All these piping systems have to fulfil the performance and quality requirements of the relevant EN standards that are generally decided by designers, specifiers, producers and users as being relevant for these particular applications.

HYDRAULICS

All commercially available plastic piping systems are well documented regarding their exact internal diameter and flow capacity. The smooth surface of the inner wall of plastic pipes guarantees a better flow than for non plastic pipes. Studies have shown that even when the maximum deflection of plastic pipes is reached, no significant reduction in flow capacity will occur.

STRENGTH/STIFFNESS

The TEPPFA Buried Pipes project showed that the flexible behaviour of plastics pipes (from SN2 – 16) results in a pipe deflection that is mainly determined by the settlement of the ground during and after installation.

Plastic pipes simply follow the ground settlement, which is normally finished within one month to two years after installation, depending of the soil compaction during installation.

From that moment on, no further deflection or deformation in the pipes will occur.

Studies have demonstrated that excavated pipes that have served up to 40-50 years operation still show physical and mechanical properties of the same level as newly produced pipes of today. So during its life, the initial pipe quality does not change at all. The **E modulus remains unchanged** which means that the resistance against external loadings remains the same during the whole lifetime of the pipes.

INSTALLATION STATICS

Static design calculations should demonstrate the ability of a pipe system to fulfil the required functioning. This means, operating without problems during the whole lifetime. In a recent TEPPFA study for Sustainable Municipal Pipes (SMP), it was demonstrated that rigid pipe systems show ~41 leaking failures per km and flexible pipes ~6 leaking failures per km. The evaluated effects on the environment are about 2 times higher for rigid pipes compared to flexible pipes.

As clearly demonstrated in the TEPPFA Buried Pipes project, it is mainly the quality of installation for both pipe systems, rigid and flexible, that determines the final performance during its lifetime. A design graph shows the predicted deflections after installation and after completed ground settlement.

INSTALLATION LENGTH

Because of the low weight per meter, plastic pipes can be used at greater

lengths. These greater lengths up to 10-12 meters can also be used efficiently in the trench where the flexibility of the pipes can easily accommodate the unavoidable unevenness of the trench bottom without causing problems.

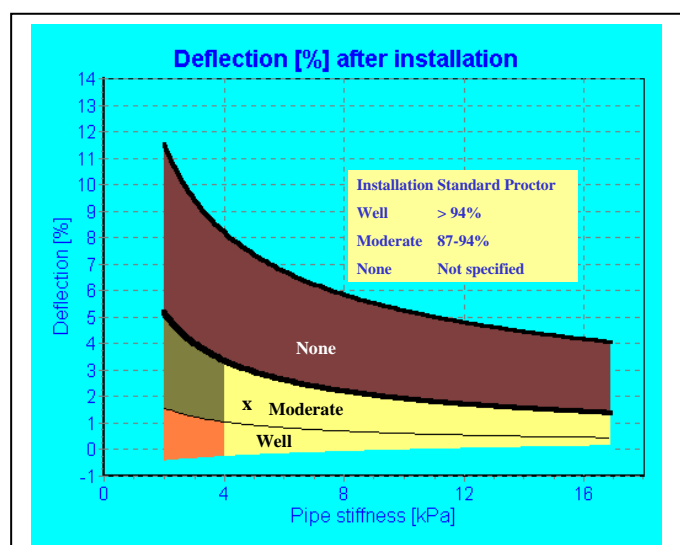
TEMPERATURE

Once properly installed in the ground, plastics sewer and drainage pipes show very minor thermal expansion (caused by soil friction but this process will anchor the buried pipes to such an extent).

The jointing systems accommodate the possible movements due to temperature variations. According to the relevant product standards, these joints are tested to fulfil the required temperature variations as defined in EN476.

BACKFILLING

A good backfilling of the trench is important for all types of pipes, rigid or flexible. For rigid pipes, poor backfilling can easily be followed by pipe failures in the ground settlement phase after installation, due to the incapability of rigid pipes to deform. Flexible pipes also need good backfilling to avoid point loading and to avoid excessive deflections during the ground settlement phase.



Sewer pipes fulfilling the performance requirements of the relevant EN standards, have been shown to be tight under deflections up to 15%. The TEPPFA Buried Pipes study has shown that under normal good installation conditions, pipe deflections do not exceed 6-8% for the used stiffness classes.

The measurement of the deflection of the installed sewer pipes is an efficient and cheap method to verify the quality of the installation. It has nothing to do with the quality of the pipe.

HIGH-PRESSURE FLUSHING

A recent TEPPFA study has shown that the most effective way of cleaning sewers is by using medium water pressure levels and high water volumes.

TEPPFA considers it as inadvisable to advocate jetting pressures higher than are needed to flush or remove blockages – especially from rigid pipes. (see also article JETTING)

ENVIRONMENT

When the environment is taken as an argument for materials, the total aspect must be taken into account. As mentioned above, the SMP project showed that rigid pipes in operation show leakages that effect the environment either by infiltration or exfiltration by 41 defects per kilometre where flexible pipes only show 6 per kilometre. The calculated relative effect on the environment is for rigid pipes two times higher than for flexible pipes. (more info about CO2 can be found in the GUA study – see Bibliography)

QUALITY

Tiem Meijering is convinced that his technical arguments far outweigh those levelled against plastic pipe systems. "It is a measure of confidence in our technology and industry that we are continuously developing exciting products. Plastics provide a sustainable world in which expectations and standards are very high. This is why TEPPFA promotes quality marks based on third party certification to illustrate the continuity of this quality level in the pipe, its installation and its performance."