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ARTICLE FOR DRAIN TRADER ON PLASTIC PIPES

THE MANY BENEFITS OF PLASTIC PIPES IN DRAINS AND SEWERS

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Plastic piping systems have been used in gravity drains and sewers for over 60 years. They are well known for their cost effectiveness and light weight but offer benefits far beyond these. Plastic pipes represent an essential part of our life support systems, delivering clean drinking water and removing wastewater all over the world.

Sustainability

The waste from plastic manufacture is actually very low and careful precautions and initiatives such as Operation Clean Sweep during manufacture aim to eliminate plastic pollution. Plastic pipes are highly recyclable, at the end of their life being used to create new products or for fuel to generate power or heat. The fact that plastic pipe is so durable will naturally limit the amount of plastic waste created and will also reduce the volume that gets recycled. This distinguishes these robust and durable types of plastics from single-use plastics.

Plastic drains and sewers are manufactured from recycled material where standards allow, and all products can be recycled at the end of their life. In addition, plastic pipe manufacturers are committed to reducing waste at source, with highly efficient manufacturing operations that minimise waste and re-integrate off-cuts into the process.

Plastic pipes are long lasting. Recent work published by TEPPFA (The European Plastic Pipe and Fittings Association) has shown that PVC-U and PE buried pipes have an expected service lifetime of over 100 years (<https://www.teppfa.eu/news2/2019/7/12/tests-confirm-100-year-expected-lifetime-for-pvc-and-pe-pipes>). Research, extrapolation studies and reports on excavated pipes in service show minimal degradation and extrapolative tests performed on these test samples confirm an expected service life in excess of 100 years. Furthermore, at the end of their life the pipes will still be in an identifiable pipe form (they do not break down), allowing them to be dug up and recovered for recycling – thus keeping them in the materials loop.

Low environmental impact

When considering the environmental impact of material choice, it is essential to consider all the impacts. A scientifically-based life-cycle assessment (LCA) is the standardised method for comparing the environmental impacts of different products across all stages of their life, from cradle to grave. A series of independent studies has been commissioned by TEPPFA and carried out by the Flemish Institute for Technological Research (VITO) to measure the environmental footprint of various plastic pipe systems, based on life-cycle assessment. The work is validated by the Denkstatt sustainability consultancy in Austria and shows positive results for plastic piping systems compared to other materials in the same applications – see more at <https://www.teppfa.eu/epdoverview>

Plastic pipes typically weigh 94% less than their concrete equivalent. As well as requiring less time, labour and heavy plant on site plastic piping systems can be transported more easily and efficiently. This saves fuel and helps to lower the product's carbon footprint when a 'cradle to grave' approach is taken.

Flexibility means strength

Beyond their long life and sustainable credentials, another key benefit is their flexibility. Whilst some may cite this as a negative, it is actually the flexible nature of plastic piping systems which is one of their greatest strengths. Flexible pipes, in contrast to rigid materials, follow the movement of the earth – whether that's differential ground movement, increases and decreases in groundwater levels, or even heavy frost which causes the water in the soil to expand. In general, flexible pipes rely upon their deformation from imposed loads to mobilise the support of material on both sides of the pipe. Their primary structural function is distributing the imposed vertical loads to the surrounding soil and bedding material. Only a small portion of the imposed loads are carried by the flexible pipe itself.

The design of a gravity pipe uses this stabilisation effect of the soil to minimise deflection in the pipe, by constraining it in the horizontal direction, and simultaneously transferring the surface loads being inflicted by the ground above the pipe (traffic, structures, etc.) to the soil. During construction (the installation phase) the weight of the soil above the pipe will cause it to deflect and this will continue as the soil is compacted (the settlement phase). With good installation these deflections are very small – less than two per cent. Thereafter, during the lifetime of the pipe, there is no significant change in the shape of the pipe.

Plastic pipes, correctly installed with well-compacted backfill material, spread any traffic load to the ground itself – meaning they are subject to lower loads than traffic and weight of soil exert. Once the backfill and soil have settled after installation, traffic loads have no further impact on pipe deflection. Good preparation is always to be encouraged, but the engineering properties of plastic pipes mean that less than perfect preparation should not adversely affect the final installation. A study from TEPPFA (<https://www.teppfa.eu/buriedpipes/>) on the performance of buried pipes under different conditions shows plastic pipes to have significant advantages.

Raising standards

Plastics offer a wide range of solutions for gravity drains and sewers including chambers and manholes. BPF Pipes Group members are committed to manufacturing high quality, sustainable products to the relevant standards. UK, European and international standards exist to protect us all from products that are not fit for intended purpose. Standards assure the reliability and effectiveness of the products in their intended applications. The long service life, strength and flexibility together with leak free joints, corrosion resistance and ease of installation make plastic piping systems the ideal choice for the drains and sewers of today and tomorrow.