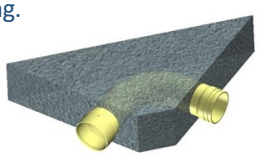
HydroFoamer
Faster, Simpler, Safer

PU Foam Backfill & Bend Forces

Pressure pipe systems often require bends to negotiate changes in direction. The laws of physics dictate that the pressure and mass of the fluid exert an outward force on the bend. This is known as 'thrust' and the energy thrusting the bend outward is known as a 'resulting force'. In water pipes, most of the resulting force is due to pressure, rather than mass and velocity, and it attempts to push the bend outward. If the bend is not to move, then the resisting forces must be greater. In many situations, the forces are so great that it is necessary to configure thrust anchor blocks, normally from concrete, to counteract the thrust forces and stabilize the pipe. If a pipe is not 'restrained', the result of outward movement at the bend is pipe rupture at the coupling.

Thrust blocks themselves are expensive to design and build and, due to their own weight, must be built in ground that will support that weight. There are many cases where the thrust block itself moves, causing the same effect: pipe rupture.

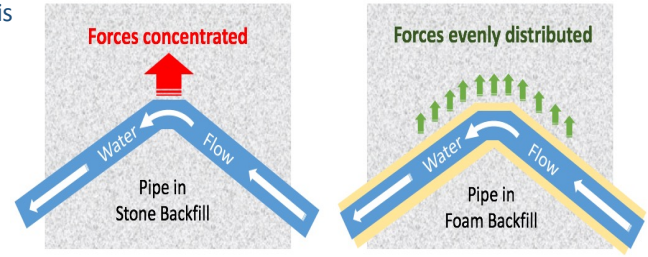


Thrust Block

How PU Foam Stabilizes Pipe Bends

Closed cell, rigid PU foam is very hard, and can be likened to 'concrete light', in terms of its mechanical properties. It is also very light and adhesive, and is often used purely for that purpose. It's stiffness and compressive strength mean that a normal grown man of 80kg or 175 lbs can stand on a piece of PU foam the size of a cupcake, without it collapsing. The adhesion strength between PU and pipe materials such as GRP is such that a square section measuring 1 square meter or 10.7 sq.ft can support 37 metric tonnes or 81,000 lbs, the equivalent of around 20 average family cars in the US.

This incredible strength and adhesion means that a water pipe bend that is laid in PU foam is glued both to the adjacent pipe sections and into the surrounding soil. Apart from stabilizing the pipe itself, the load spreading capacity of the foam means that the thrust forces are spread over a much greater area, before transferring the thrust forces to the surrounding soil, whilst adding no appreciable weight to the system. Finally, the compressive strength mobilization of the PU means that it will tolerate an extremely high weight of backfill and resist dynamic loading, for example from vehicle and foot traffic.

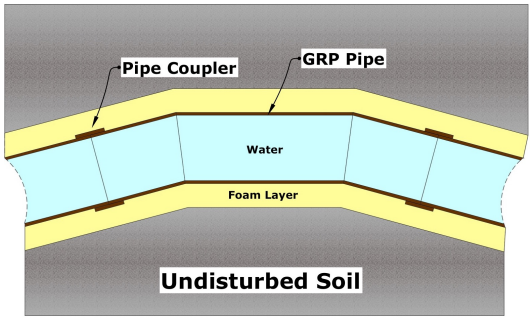


Quicker installation

Either individually, or as part of a larger PU backfill project, using the HydroFoamer system is very much quicker and cost effective. PU foam for an anchoring application can be produced at more than 22kg or 50lbs per minute, which is the equivalent of 0.5m3 or 18 cu.ft., or more than a ton of typical concrete. This speed of installation means less disruption to the pipe installation area, and lower terrain / area utilization for building materials, as the PU foam components are part of the mobile installation system.

Safety and Sustainability

PU foam has been used safely for over 60 years in different applications. Advances in formulation and production methods mean that PU foam is both environmentally friendly (0 GWP and 0 ODP*) and recyclable. PU foam is produced by simple and reliable pump systems that can be maintained and operated by standard contractors with minimal investment in training and using standard engineering techniques for both design and construction. The thermal and physical insulation properties of PU foam are already well-known, and when these same properties are utilized in a pipe system, they provide excellent protection against frost, corrosion and mechanical damage, meaning less maintenance and greater longevity of the entire system. In addition to compliance with existing building codes, PU foam has recently been authorized by the Norwegian government as replacement for backfill in hydropower in the pristine arctic and mountains regions of Norway.



Quality & Performance

Where excellence is essential, this system is the solution. It out-performs all current approaches and delivers quality and performance by virtue of basic physics, drastically reducing failure rates due to mechanical loads and wear.

(GWP – Global Warming Potential, ODP – Ozone Depletion Potential)*

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