

CONCRETE WATERPROOFING INJECTION

Resin injection to waterproof concrete is probably the most widely used application of injection in the industry. Well-established in tunnelling, it has yet to reach its full potential in the repair and maintenance of bridges and substructures, where it can offer an economical solution to stop water ingress where other waterproofing measures have failed or, as seems to happen all too frequently, been damaged by utility works. Waterproofing injection can significantly extend the lifespan of a structure.

TYPICAL TUNNELLING APPLICATIONS

- Segment tunnel crack repairs
- Segment tunnel gasket repairs
- SCL tunnels crack repairs
- Secant pile crack repairs: horizontal/ structural or seams
- Re-injectable tube systems for joints
- for ground consolidation to shafts and headers please refer to Ground Stabilisation

TYPICAL BRIDGE APPLICATIONS

- Soffit repairs
- Abutment repairs
- Retaining wall repairs
- Service tray waterproofing
- Concrete waterproofing system
- Cast-iron waterproofing system

KEY BENEFITS OF WATERPROOFING / STRENGTHENING INJECTION

- Full control of set times
- Good chemical resistance against salts
- Inhibits rust
- Good cost control: can be reactive (spot injection)
- All quantities can be measured and recorded
- Bridges: Injection can be carried out above or below soffit
- Retains appearance of existing structure
- Works with water management, e.g. weep holes

TYPICAL SUBSTRUCTURE APPLICATIONS

- Crack bonding
- Delamination repair
- Retaining walls, upstand/ kickers, diaphragm walls
- Failed gasket joints



Leaksealing injection between floor slab and wall

EQUIPMENT & RESIN SPECIFICATION

Most resins can be injected using easily portable 110-volt electric pump. The most suitable resin for a concrete waterproofing or strengthening depends mostly on the nature of the leak or repair, its location, the speed of any water ingress, and the requirements for strength and flexibility.

In principle, there are four options: PUs, acrylic resin, epoxy resin, and silicate. PUs are used primarily for gasket and larger crack repairs: they cure quickly to form a semi-rigid to rigid seal. Acrylic resins are more viscous, and used to penetrate fine cracks. Epoxy resins give structural strength and can be used for waterproofing/ structural repairs, e.g. horizontal cracks in secant piles. Epoxy resins can successfully seal wet cracks without flowing water, or strengthen areas of poor quality concrete. Silicates are indicated where concrete shows damp spots without cracking. Please also see our FAQ for more details on the different resins.

SERVICE TRAY INJECTION

Injection is particularly useful for solutions in hard-to-access or sensitive areas, for example service trays. Here, waterproofing injection avoids disruption of cables and pipes, and can link with existing waterproofing in the road deck. Resin injection allows work from beneath the soffit, with the structure remaining in full use – offering a low impact alternative to conventional methods of repair. In most cases, traffic management is unnecessary.

APPLICATION CONDITIONS & LIMITATIONS

PU resin are injected with a catalyst and will set in minutes, depending on the amount of catalyst added or the volume of water present. Set times are affected by temperature, and can be manipulated by length of hose/lances. Acrylic resins have permanent open times until an accelerator is added, giving maximum flexibility. Resins are affected by temperature, with cold weather conditions slowing down the reaction time. Can be potable water safe, WRAS approved.

EXAMPLE CONCRETE WATERPROOFING PROJECTS

- Thames Tideway
- Northern Line Extension, FLO
- LUL Finsbury Park, Spencer Group
- UCLH Proton Beam Therapy, Bouygues
- CrossRail (Bond St, TCR & Fisher St, Canning Town, Stepney)
- Qatar Rail, Doha: Gold Line, Red Line
- EVA Knighton Powys, Barhale



PU waterproofing injection in a lift shaft



Acrylic waterproofing injection to a bridge soffit



Waterproofing injection in an underpass



PU gasket injection in a segment tunnel