

“Deepest level” installation of FRIAFIT® Sewage Sleeves in Wiesbaden

Customer: Landeshauptstadt Wiesbaden, Entsorgungsbetriebe
Invitation to Tender and Building Management: Ing.-Büro Schirmer Umwelttechnik GmbH, Mainz
Pipe Installation: KS GmbH, Kunststoff- und Stahlverarbeitung, Ingelheim
Microtunnelling: Sonntag-Bau, Bingen

Background: The sewage treatment plant at Biebrich, part of Wiesbaden, had to be exposed to an additional, third cleaning level due to EU guidelines. For cost reasons the Mainz-Kostheim and Mainz-Kastel sewage treatment plants were left open and the sewage was taken to Wiesbaden-Biebrich by means of pressure pipes. In Biebricher Strasse a pressure pipe system for combined sewage had to be installed under the temporary operational pressure of 3 bar. Part of this pipe system was carried out using HDPE, combined with FRIAFIT® d400 Sewage Sleeves. This pipe system was inserted into concrete pipes DN 1000 which were installed down to a depth of 12 m as they had to cross underneath underground tunnel installations by a large company.



Size of Project

No FRIAFIT® sewage coupler has ever been installed so deeply: 12 m under an industrial road in Wiesbaden-Amöneburg and quite close to the Rhine - this was not going to be an everyday project! The DA 400 HDPE sewage pressure pipes were installed in a twin version underneath the tunnel-like industrial cross connections, similar to a crossing underneath a river. Starting from a standard installation depth of 2 m using GFK pipes, the pipe run was installed underneath the tunnel installation near a building made of reinforced concrete 12 m down which at the same time serves to ventilate and drain off the waste water pressure pipe system, and then elevated to the initial level at the end of the pressured sections.

The length of this HDPE twin pipe installation into the reinforced concrete pipe was about 600 m. The reinforced concrete pipe driving was carried out from 3 holes ranging in depth from 6.5 to 12 m.



Picture 1: HDPE pipes, 6 m long, in twin pack, in 8 m deep hole



Installation Technique

The priority was to install the sewage pipe in HDPE twin pipe version, combined with 250 d400 FRIAFIT® Sewage Sleeves in great depth with maximum safety: that means particularly leak-proof and longitudinally strong. For this reason a combination of HDPE and reinforced concrete pipes was chosen: Three-meter-long steel reinforced concrete DN 1000 pipes were installed from three holes using a drilling head into hydraulic earth with wet soil discharge (Microtunnelling). A metal track with U profile was dowelled onto this concrete pipe run for gliding and aligning purposes for the HDPE pipe run to be inserted.

Picture 2: Measuring of pipes and FRIAFIT® Sewage Sleeves to fit pipe run already inserted

Preparation and Integration of the pipes into FRIAFIT® Sewage Sleeves

In order not to have to make the holes too large - excavation and especially deep concrete installations are exceptionally expensive - only six-meter-long DA 400 HDPE pipes, SDR 17.6, were used. These were prepared for installation and for receiving FRIAFIT® couplers outside the holes. The oxide layer on the pipe ends to be

The following sections of HDPE pipe of 6 m length were then height- and width-aligned in the hole with the pipe run already inserted into the reinforced concrete pipe. The FRIAFIT® electrofusion couplers were slipped for over half their length from the new pipe section onto the pipe run inside the reinforced concrete pipe. Both pipes were then connected with the electrofusion unit FRIAMAT® – leak-proof and longitudinally strong.



Picture 3:
FRIAFIT®-electrofusion process of couplers with pipes

Picture 4:
Pressure test with 9 bar water on inserted pipe run

connected by FRIAFIT® electrofusion couplers was removed with a scraper tool. Afterwards FRIAFIT® couplers were attached to the two pipe ends. The prepared HDPE pipes were connected in twin packs with T-iron, clamps and bearing pads, lowered through the hole and inserted into the U profile of the metal track dowelled onto the reinforced concrete pipe. This way the pipes were properly aligned when they were drawn into the concrete pipes. The pipe section was then pulled six meters into the reinforced concrete pipe by means of a rope winch from the next hole along.



Pressure test with 9 bar water

As soon as one pipe section was in place between one hole and the next (about 150-250 m per section), a pressure test took place using 9 bar water. In order to ensure a long service life of the combination of concrete pipe and HDPE twin pipe, the gap between concrete pipe and HDPE pipe run was afterwards filled with light pore concrete.

The FRIAFIT® Sewage System – a jointing system for HDPE pipes

In addition to the Sewage Sleeves introduced in this project report, the following are also part of the FRIAFIT® Sewage System: Sewage Inspection Chamber Adapter, Sewage Insert Sleeve, Sewage Saddles and Transition Pieces for connection of PVC(KG) and HDPE pipes.

FRIAFIT® Sewage Fittings connect HDPE pipes leak-proof and longitudinally strong using FRIAFIT® fusion technique. Cracks by ingrowing roots, static stress or flooding of the pipes cannot occur.

The FRIAFIT® Sewage System benefits from many years' experience of the worldwide successful use of FRIALEN® Safety Fittings for HDPE gas and water pipe systems.

Our customer service personnel and specialist advisers will be happy to give you further information. Please give us a call!



Picture 5: HDPE pipe run surrounded by light pore concrete



Picture 6: FRIAFIT® sewage programme