

# Testing assignment: IKT puts pressure on manhole lining

**Leaks cannot be tolerated! So manholes in high water table areas must reliably keep any groundwater out. They need rehabilitating if they no longer do this. There are numerous methods to choose from.**

Schacht + Trumme W. Schwarz GmbH, of Ahrensburg Germany, wanted to know whether their HDPE manhole lining would withstand continuous exposure to external water pressure, so they commissioned a test by IKT. The lining was installed into a systematically „pre-damaged“ manhole structure consisting of prefabricated concrete elements in IKT's large-scale test facility.

### Presence of groundwater simulated

The test programme, specially adapted for this particular case, included the following operations:

- Observation and documentation of installation of the manhole lining in a manhole shaft consisting of prefabricated concrete elements at IKT's large-scale test facility
- Application of external water pressure to the lining by means of two-stage flooding of the test facility (for a total of six months of water-pressure exposure of the lining)
- Visual inspection of the lining during exposure to external water pressure
- Checking of the bond strength of the lining/ mortar back-fill with the manhole wall



A giant sandpit: IKT's 6 m deep large-scale test facility can be flooded.



Cleverly folded: the elements of this lining fit easily through the manhole entry hole.

The client's rehabilitating team installed the around 3 m high partial lining in the 5.5 m deep manhole shaft with no pre-sealing of the „implanted“ points of damage. One day later, the large-scale test facility was flooded to a depth of two metres above the bottom sheet of the lining. This water level was kept constant for nearly four months, and then increased in increments to 4.5 m. This raised external water pressure was then maintained for another two months.



The joints between the individual elements are carefully sealed.

### Leak tight to the end

IKT's test personnel inspected the lining at regular intervals for leaks and any other abnormalities. They found no leaks and no other abnormalities at any time during the test period or after the end of exposure to external water pressure. The connecting points of the newly installed climbing irons were also tight.

The bond strength of the PE lining and the grouting mortar with the wall of the manhole shaft was on average 0.4 N/mm<sup>2</sup> across various testing points.



The annular space between the manhole shaft and the lining is firstly grouted using mortar, and then sealed.

None of the tests carried out indicted in any impairment of the leak tightness and confirmed the suitability for use of this lining.

The overall verdict of IKT's test personnel was: PASSED.

The test report (German only) is available for free-of-charge to download at:  
[www.ikt.de/downloads/pruefberichte](http://www.ikt.de/downloads/pruefberichte)

## **IKT Comparative Test „Manhole Rehabilitation“**

IKT's Comparative Test „Manhole Rehabilitation“ has been undertaken at the large-scale test facility in Gelsenkirchen. Various rehabilitation methods, such as a range of coatings and linings, have been comparatively tested, under exposure to external water pressure, among other things. More about the Comparative Test and its results see page 5.

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neutral  
independent  
non-profit institute



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# ABOUT IKT



**IKT - Institute for Underground Infrastructure** is a research, consultancy and testing institute specialized in the field of sewers. It is neutral and independent and operates on a non-profit basis. It is oriented towards practical applications and works on issues surrounding underground pipe construction. Its key focus is centred on sewage systems. IKT provides scientifically backed analysis and advice.

IKT has been established in 1994 as a spin-off from Bochum University, Germany.

The initial funding for setting up the institute has been provided by the Ministry for the Environment of the State of North-Rhine Westphalia, Germany's largest federal state.

However, IKT is not owned by the Government. Its owners are two associations which are again non-profit organizations of their own:

**a) IKT-Association of Network Operators:**  
Members are more than 130 cities, among them Berlin, Hamburg, Cologne and London (Thames Water). They hold together 66.6% of IKT.

**b) IKT-Association of Industry and Service:**  
Members are more than 70 companies. They hold together 33.3% of IKT.

You can find information on projects and services at:  
[www.ikt-online.org](http://www.ikt-online.org)



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