

## **IKT-Product-Test “Inspection-Systems for Domestic Sewer Networks”**

*Dipl.-Ing. Gunter Kaltenhäuser, Project Manager*

*IKT - Institute for Underground Infrastructure, Exterbruch 1, 45886 Gelsenkirchen, Germany  
e-mail: kaltenhaeuser@ikt.de*

### **1. Introduction**

The objective of IKT-Product-Tests is to provide network operators with reliable and independent information on the properties of products of the pipe technologie. Such information has been almost completely missing for the pipeline construction and rehabilitation area until now. The clients attain information on product characteristics almost exclusively from advertisements and the offerers' brochures, who try to convince potential customers of the alleged quality of a product. The aim is, to assess the quality of products available on the market, to indicate potentials for improvement and simultaneously to develop an appropriate market pressure so that product suppliers will indeed exploit these potentials.

A central aspect of the IKT-Product-Test is the practical product quality evaluation, e. g. under operating conditions. The focus of the examinations is not the compliance with individual standards or bodies of rules and regulations, but the reliable fulfilment of network operator requirements during construction and operation. The service life under the expected conditions and loads, such as e. g. groundwater, earth pressures, volume of traffic or high-pressure cleaning, are the focus of attention. As a result the network operators are provided with independent, practice-related, and technically well-founded information concerning the strengths and weaknesses as well as areas of application and limits of the tested products. The main focus during IKT-Product-Tests is on three examinations: Process offerer quality assurance, system tests and building site investigations.

At the end of IKT-Product-Tests a score card with a comparative evaluation of the products is developed on the basis of the test results. Test marks are formulated using the quality assurance of the process offerers and system tests as investigation priorities. The building site investigation results were not taken into consideration for the test marks, because building site conditions are not comparable.

In this way IKT tested in 2005 special, new-developed devices for the inspection of domestic sewer networks.

### **2. IKT-Product Test “Inspection-Systems for Domestic Sewer Networks”**

In North-Rhine-Westphalia, Section 45 of the Regional Building Regulations [i] specify that the owner of a piece of land must have older laterals and base lines in water protection areas checked for leaks by 31st December 2005. Newer laterals and base lines, and those outside water protection areas, must be inspected by 31st December 2015.

In recent years the industry has reacted and developed special inspection systems for the use in domestic sewer networks. These remarkably small and manoeuvrable cameras are particularly suitable for the inspection of the narrow and highly branched networks out of the main sewer or demarcation chamber/ manhole. But what can these systems do? This question

was answered in the IKT-Product-Test. The following inspection systems were closely examined:

The “**Aaligator**” is a hydraulically driven camera system. The drive unit has a collar of hydraulic nozzles. The optical unit consists of an axial camera and incorporates nozzles aimed laterally, so that the system can move sideways. Manually turning the high-pressure hose at the same time makes it possible to turn to other lateral/base line branches.



The hydraulically driven “**Göttinger ZK-Kanalwurm 70/500**” includes a carriage unit with an axial camera mounted in the head of the carriage. The system can be turned up to 90° to the side, and if the “worm” is advanced at the same time, it can be made to turn into lateral/ base line branches. In addition to its function as an inspection unit, the “worm” can be used as a blocking unit for leak tests.



The successor model of the “**Göttinger ZK-Kanalwurm 70/500**” offers the features of the “old” worm model, while the camera’s pan/tilt head also makes it possible, for instance, to pivot over a damage. This model is also fitted with a front rinsing unit, with which the camera lens can be cleaned.



The “**Göttinger ZK-Kanalwurm 50/300**” is a smaller version of the “**Göttinger ZK-Kanalwurm 70/500**”. The small worm was specially developed to inspect laterals/ base lines with very narrow nominal widths. The short carriage unit is fitted with an axial camera. The worm can be turned smoothly in four directions by up to 90°. It is not possible to pivot over a damage. The small worm has not been designed as a blocking unit for leak tests.



The “**Lindauer Schere (mini)**” consists of a camera on a pan/tilt head onto which an extendable mechanical scissors unit has been mounted. When examining a branching lateral/ base line, the camera head is turned in the direction of the branch that is to be recorded, and the scissors are extended. The system is therefore turned into the branch when it is further advanced. The scissors are then withdraw again.



The “**Orion L (Kieler Stäbchen)**” consists of camera on a pan/tilt head to which a guide bar has been fastened. This is not telescopic. The Orion L is turned into the branching lateral/ base line with the aid of the glass fibre rod and enters as it is advanced further. The guide bar always remains in the camera’s view during optical inspection.



To test the inspection-systems IKT built a test bed in it’s industrial size test rig (18 m x 6 m x 6 m), corresponding to real domestic sewer networks. Six different inspection-systems had been examined during these system tests. The tasks for the companies who submitted their systems for test purposes, were to find out the structure of the networks and to localize damages which had been created in the pipes. For the technicians who carried out the inspections was not visible that the three networks which had been built were identical. This circumstance had consequences with interesting results. Furthermore the quality assurance of the companies for their inspection systems was investigated and the application of the inspection-systems in present domestic sewer networks was accompanied in the cities of Gelsenkirchen, Göttingen and Würzburg.

Because of the test results all the tested inspection systems were evaluated with the test mark “GOOD” in the finally developed score card. Nevertheless they have all there advantages and disadvantages for the use in domestic sewer networks.

### **3. Final conclusion**

The IKT-Product-Test “Inspection-Systems for Domestic Sewer Networks” is the third IKT-Product-Test (cf. IKT-Product-Tests “Lateral connections” [ii] and “Repair methods for lateral connections” [iii]). The eager participation of sewer network operators in the IKT-Product-Tests underlines their practical significance. The way the test results are accepted in the trade also shows what a demand there is for comparative product tests in sewer technology. The IKT product tests support the “circle of product improvement” (cf. [iv]) and the development of improved or even new products (cf. [v]). The overall aim in future will remain that of improving the quality of the offered products in the interests of the sewer network operators.

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## Bibliography

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