

## TEST REPORT: P07104-T04

Gelsenkirchen, August 30, 2019

**Customer:** Obduramus Umwelttechnik  
GmbH Brückenäckerstraße 2  
75328 Schömberg

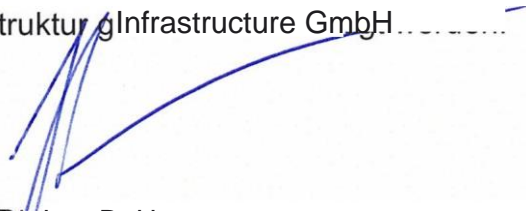
**Test order no.:** P07104

**Name of test order:** Pilot building site for interior pipe collar  
Circum-MINI

**Name of customer: Order date:**  
  
22/05/2018

**This test report comprises seven pages.**

The test results pertain exclusively to the test specimens. The test report may be duplicated in part only upon written approval by IKT - Institute for Underground Infrastructure GmbH.....



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(head of test facility)



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(project head)

**Samples**

Sample name		Samples produced by	Description of the test specimen
Consecutive no.	IKT (Test facility)	AG	
1	Circum-MINI DN300	AG	Interior pipe collar Circum-MINI DN 300 made of EPDM with stainless steel sleeve

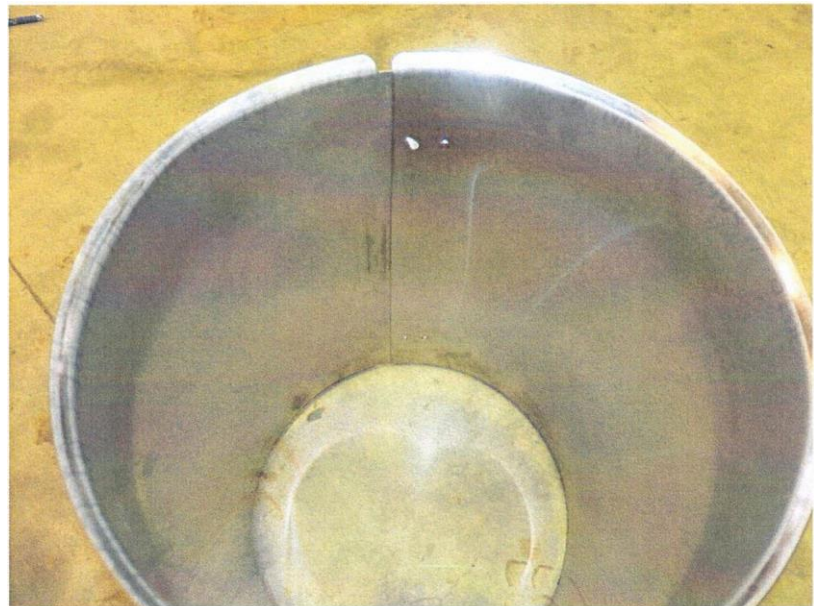
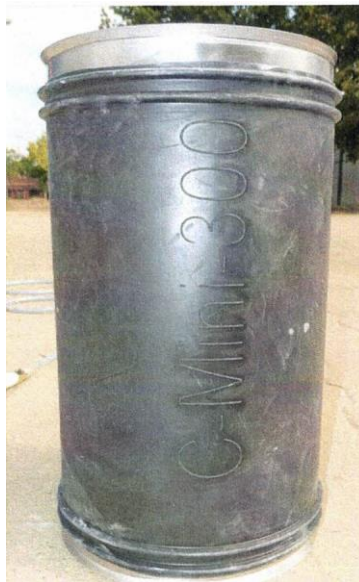


Figure 1: Interior pipe collar Circum-MINI, DN 300

## 1. Reason for testing

On May 22, 2018 the Obduramus Umwelttechnik GmbH ordered IKT to implement usability tests on interior pipe collars of the Circum-MINI type (abbreviated: C-MINI).

The Circum-LEM is composed of an EPDM collar and a stainless steel sleeve with an external closure. By clamping the stainless steel sleeve by means of a packer, the EPDM collar is pressed against the pipe interior wall, so that the sealing lips at the ends seal off the collar in relation to the sewer and according to the principle of compression-sealing. Retightening the sleeve is possible at any time.

In order to verify the general building approval for the Circum-MINI, so that the interior pipe collars can be installed in sewers, the installation procedure was documented in above ground trial segments with non-sealed pipe connections DN 300.

The installation of the collars took place to test high pressure flush stability and water tightness (see also report P07104-T03), which is not a part of this report.

## 2. Structure of the Circum-MINI interior pipe collar

The interior pipe collar Circum-MINI comprises an EPDM elastomer collar and a stainless steel sleeve (Figure 2) and is currently offered by the manufacturer at a nominal width DN 150 to DN 400. The abbreviation C-MINI and the respective dimension appear on the elastomer collar. The collars are completely premounted by the manufacturer; that is, the elastomer collar is put over the stainless steel sleeve. By using a lubricant (talcum), the elastomer collar can be shifted on the stainless steel sleeve and thus always be positioned in the middle.

The thickness of the EPDM-elastomer collar (ethylene-polypropylene-diene rubber) is 2 mm. The collar features two sealing lips at a spacing of 15 mm at each of the two ends. Depending on the nominal width, the height of the sealing lips varies from 5 to 8 mm and the length of the sealing area from 310 to 330 mm.

The stainless steel sleeve is composed on V4A stainless steel. Interdependent with the nominal width, the sheet metal thickness varies from 1.0 to 2.0 mm and the length from 400 to 450 mm. The stainless steel sleeve is flanged outwardly at both ends to protect the elastomer collar during operation (Figure 2). The protected external closure is fixed by engaging in an interlock, the interlocking being activated by means of a spring (see also Figure 3).

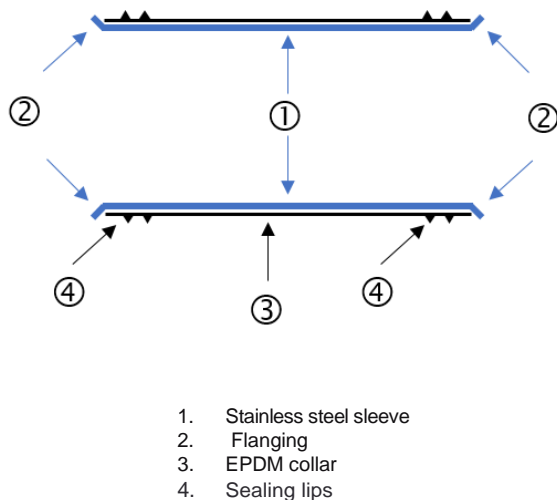


Figure 2: Graphic illustration of the Circum-MINI interior pipe collar in section

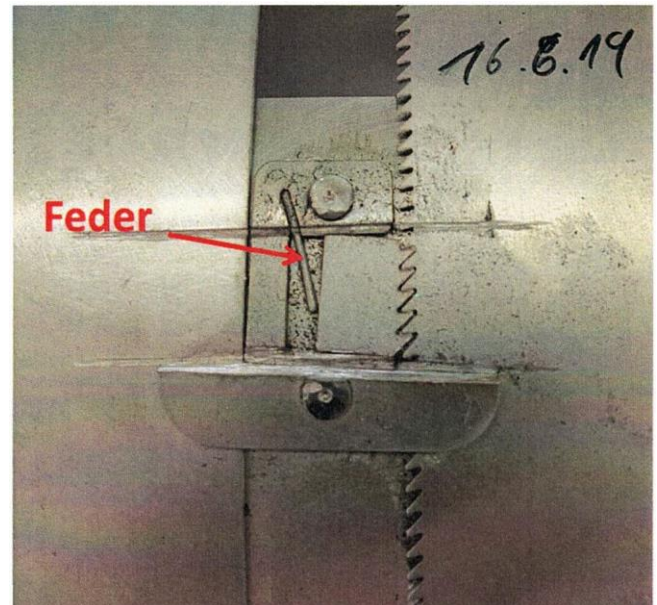


Figure 3: Exposed closure for the stainless steel sleeve



### 3. Installation

The installation of the interior collar Circum-MINI takes place in three above-ground segments, each respectively comprising two stoneware pipes, concrete pipes and PVC pipes DN 300 (Figure 4). Leaks in the pipe connections were created prior to the assembly by the partial or complete removal of seals.



Figure 4: Test segment 1 (stoneware-stoneware), test segment 2 (concrete-concrete) and test segment 3 (PVC-PVC) DN 300

The EPDM elastomer collar can be shifted on the stainless steel sleeve and should be positioned in the middle of the sleeve. The interior pipe collar can subsequently be placed centered on the packer, whereby the row of teeth on the closure mechanism is located on top (between 10 and 2 o'clock). A shifting of the collar on the packer during the installation can be prevented by a slight addition of pressure and filling the packer. The collar in that case does not widen, but rests fixed on the packer. Additionally, the packer has rollers, so that the collar will not grind into the base (s. Figure 6).

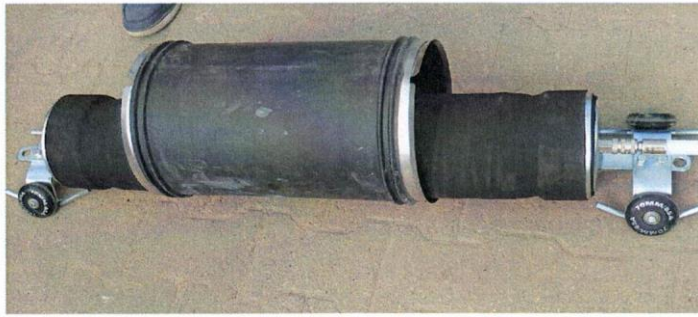


Figure 5: The Circum-MINI and the associated packer for placing and setting the collar into the pipe.



Figure 6: The Circum-MINI collar, fixed on the packer, can be positioned in the pipe.

The collar is placed in the middle across the unsealed pipe connection with the aid of pushing rods and the rollers on the packer. The distance from the start of the pipe to the pipe connection was measured carefully in advance.

The collar expands by slowly filling the packer with compressed air and it is pressed against the inside wall of the pipe at a pressure of 3.5 bar. The stepwise engagement of the interlock can be heard by a “click” sound.

The pressure is then released from the packer. Because the manufacturer, Obduramus Umwelttechnik GmbH, recommends that the collar be pressed-on twice, the packer is again filled at 3.5 bar and the collar is further pressed onto the interior wall of the pipe. The installation ends after the pressure has been released and the packer removed.

The Circum-MINI interior pipe collar (Figure 7) is permanently pressed against the interior wall of the pipe after it has been installed in this way and it can then fulfill its sealing function. Retightening the collar is possible as needed at any time.



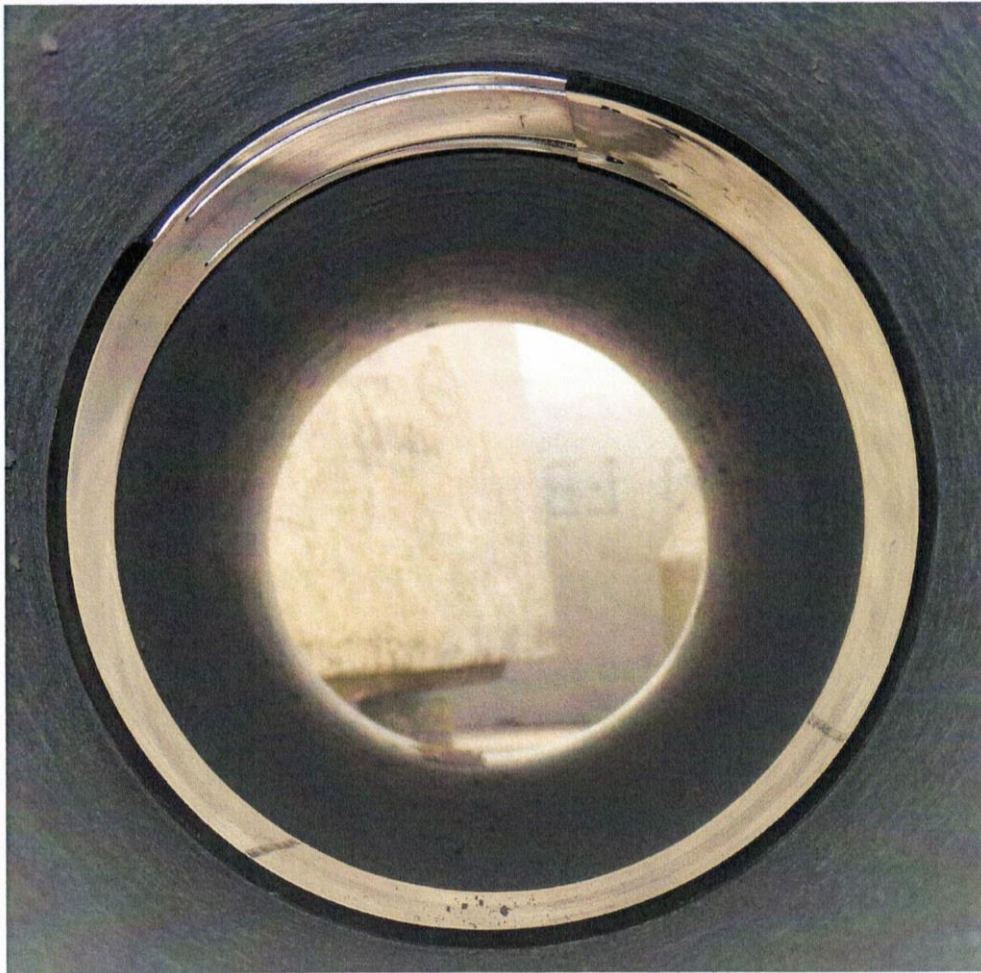


Figure 7: Installed Circum-MINI collar (closure on top)

