

Report

Nr.: G 30 887-1

Material test of resistance to high pressure jetting – stationary jet test based on WIS 4-35-01, October 2008

HS-Rohrsystem

Client:

Funke Kunststoffe GmbH Siegenbeckstraße 15 59071 Hamm-Uentrop

Company:

iro GmbH Oldenburg Ofener Straße 18 26121 Oldenburg

Date:

5th of June 2014

Projectengineer:

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WIS 4-35-01 (October 2008)

Report

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1 Introduction

The iro GmbH Oldenburg conducted a jetting-resistance test with a stationary water jet on the product mentioned below. The material-test was carried out in based on WIS 4-35-01, October 2008 [1]. Content of this standard are test methods for vitrified clay pipe systems for drains and sewers.

Test Specimen:

Quantity of components	1	
Used In	Stationary jet test based on WIS 4-35-01 [1]	
Material	PVC-U	
Manufacturer	Funke Kunststoffe GmbH	
Product-Identification	HS-Rohrsystem	
Nominal diameter	DN/OD 110	
component length	0,30 m	



Figure 1: test specimen



2 Test specifications

The test procedure complied with the requirements mentioned below.

Testing with stationary nozzle (Stationary/ Deblocking Test)

While testing with the stationary nozzle (Stationary/Deblocking Test), the pipe material is stressed by a single water jet at 6 different positions, uniformly distributed in the test specimen. At each position the water jet remains for 3 min while holding a water-pressure of 280 bar (± 5,0 bar).

Requirements based on WIS 4-35-01, October 2008 [1]:

Water source	Drinking water quality standards
Pressure at nozzle	280 bar
Flow rate	6,15 l/min 8,25 l/min.
Angle of nozzle to test surface	30° ± 1°
Vertical distance from nozzle to surface	5,0 mm (± 0,5 mm)
Orifice diameter	1,00 mm (-0,00 mm + 0,05 mm)
Overall length	Pipe divided into 6 sections
Number of individual tests	6 piece
Testing procedure	The nozzle remains at one position for a duration of three minutes

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A stainless steel nozzle (see figure 2) is used for the stationary jet test mentioned above to comply with the tolerance ranges specified based on WIS 4-35-01, October 2008 [1].

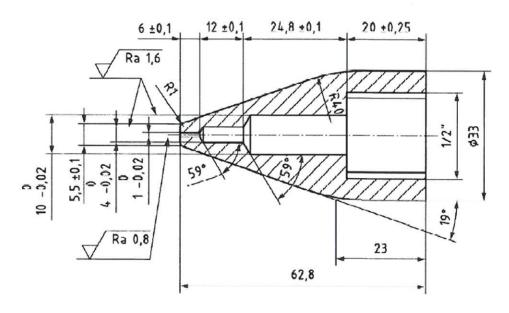


Figure 2: design drawing of the nozzle Ø 1,0 mm based on WIS 4-35-01, October 2008 [1]

All supplementary requirements remained within the range of tolerance stated in the Technical Report. Those parameters are listed in the additional inspection protocol.



3 Test procedure

The material test has been carried out on the 17th of April 2014 at the iro GmbH Oldenburg research department. The interior surface of the test assembly (see figure 3) has been inspected prior to testing. No imperfections have been located. The test assembly was placed into the rig and adjusted to level.

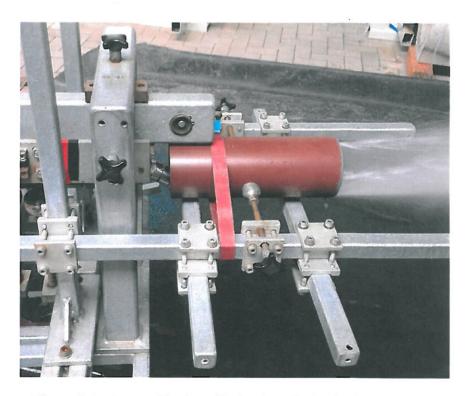


Figure 2: test assembly placed in the rig at the iro GmbH Oldenburg

The interior surface of the test length was inspected after testing.

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4 Results

The inspection of the interior surface of the tested PVC-U pipe named "HS-Rohrsystem DN/OD 110" produced by Funke Kunststoffe GmbH showed that the tested pipe withstood the "stationary jet test"- conditions based on WIS 4-35-01, October 2008 [1].

Oldenburg, 5th of June 2014

i. V. Dipl.-Ing. Bernd Niedringhaus

i. A. Sebastian Rolwers (B.Eng)



5 Literature

[1] [1] WIS 4-35-01: SPECIFCATION FOR THERMPLASTICS STRUCTURED WALL PIPES - SUPPLEMENTARY TEST REQUIREMENTS; UK Water Industry; Oc-tober 2008: Issue 2

6 Annex

 Inspection protocol resistance against high pressure jets of water with stationary nozzle based on WIS 4-35-01, October 2008 [1]

Protocol

Material test of resistance to high pressure jetting – Stationary jet test based on WIS 4-35-01



Project:
Date of testing:
Tested by:

Manufacturer: Funke Kunststoffe GmbH

G 30 887-1

17.04.2014

SRo

Pipe system: HS-Rohrsystem DN/OD 110

IRO specimen identification: H-1145 - G 30 887-1



Figure 1: test assembly

Protocol



Material test of resistance to high pressure jetting – Stationary jet test based on WIS 4-35-01

Testing parameter:

angle of the jet axis to the test surface α	30°
orifice diameter of the nozzle insert	1.01 mm
exposure time on each checkpoint	3.0 min
Average ambient air temperature	11 °C
Water temperature average	13 °C
Jet spread angle ω	< 3.3°
cd – coefficient prior to testing	0.617
cd – coefficient after testing	0.621

checkpoints	Vertical distance between the test surface and the centre of the nozzle orifice	pressure average	flow average
1	5,01mm	278,52 bar	7,22 l/min
2		283,76 bar	7,27 l/min
3		279,34 bar	7,22 l/min
4		279,06 bar	7,24 l/min
5		282,67 bar	7,26 l/min
6		282,74 bar	7,28 l/min

Results / Documentation of damages

Surface appearance of testing assembly prior to testing:

- Mainly plane, small unevenness and no chipping at the inner wall of the tube

Surface appearance of testing assembly after testing:

- See the following documentation.

Protocol

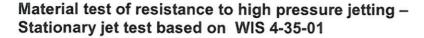




Photo documentation

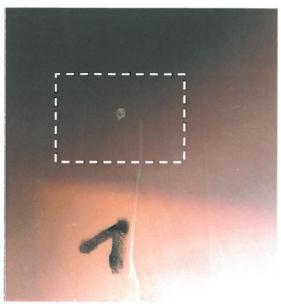


Figure 2: checkpoint 1 after testing

- The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.

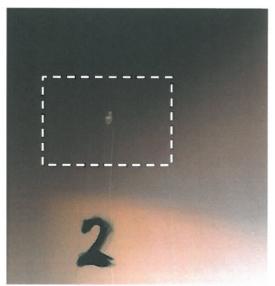


Figure 3: checkpoint 2 after testing

- The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.

Protocol

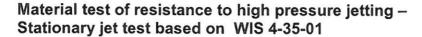




Photo documentation

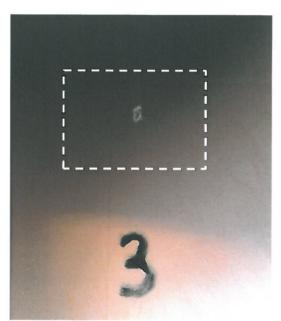


Figure 4: checkpoint 3 after testing

- The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.

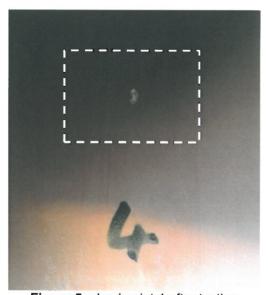


Figure 5: checkpoint 4 after testing

The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.

Protocol

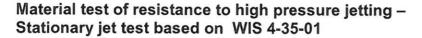




Photo documentation

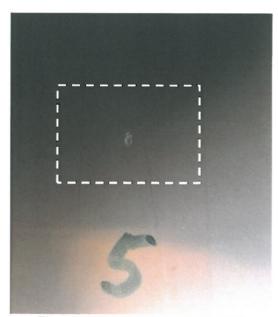


Figure 6: checkpoint 5 after testing

- The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.

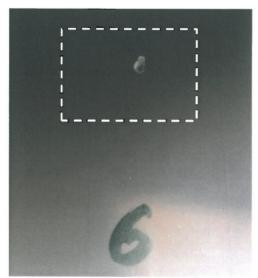


Figure 7: checkpoint 6 after testing

- The inner surface of the test piece was, however, in the area of the checkpoint to be evaluated during the test attacked not penetrated.