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CIPP - RENOVATION OF PRESSURE PIPES

STATUS QUO, PERSPECTIVES, QUALITY ISSUES

Contents

- The latest RSV-leaflet 1.2 - the main elements
- The quality management of pressure pipes
- Share your experiences and discuss with us!

Traffic obstructions:

Pipe burst: Tempelhofer Damm closed

A sewage pipe broke under Tempelhofer Damm on Friday night, flooding the street extensively. Water also penetrated the Paradestraße subway station. Tempelhofer Damm will be closed to the public all weekend....




Die geplatze Abwasserdruckleitung unter dem Tempelhofer Damm. FOTO: DAPD

Fecal fountain: Two sewage pressure pipes burst in Halle-Neustadt - repair time still unclear

VON ESEPPELT · 8. FEBRUAR 2022





Why are Pressure Pipes such an important topic for us?

Typical Damages

- Growing number of defaults and incidents



- Pitting corrosion

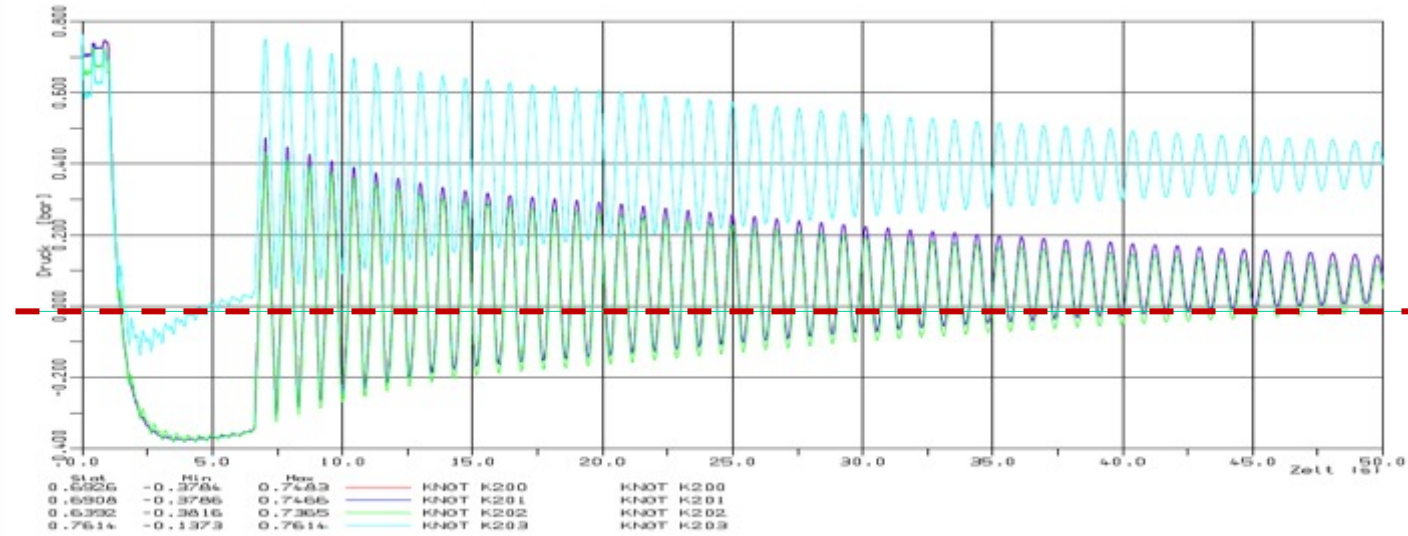


- Longitudinal crack

Pressure Pipes – The special Challenge

- Shutdown for cleaning and inspection only exceptionally
- Often long stretches without inspection facilities
- Comprehensive condition data for planning of renovation is often missing
- Switching operations of wastewater pumps can trigger pressure peaks...

Requirement: Critical Load Cases



Overpressure

Low Pressure

- Quelle: Hamburg Wasser

Time to renovate?

- CIPP as standard is established in gravity sewers
- So far no rules for pressure pipe renovation



Higher technical specifications

- Pressure hose liner must withstand pressure shock waves (overpressure and low pressure)
- Pressure pipe liner must allow permanent, safe integration into the existing network and can only be considered as a pressure pipe liner system
- Installation of the liner must be fast for immediate reactivation (economic efficiency) and must be safe (high potential for damage to pressure pipes)

What's in the leaflet RSV 1.2?



The Leaflet 1.2...

- fills the regulatory gap of CIPP for Pressure Pipes
- outlines the normative basis
- defines requirements for materials, techniques and procedures
- presents basic principles for planning, execution and testing
- defines the pressure pipe liner **as a system** for the first time
 - **pressure pipe liner as well as its connections and connections to the pressure pipe network**
- lists requirements for quality assurance based on typical operating conditions in the pressure pipe system
- isn't available in English, but we're working on it...

Planning



- Cleaning



- Details on pipe, bedding, soil

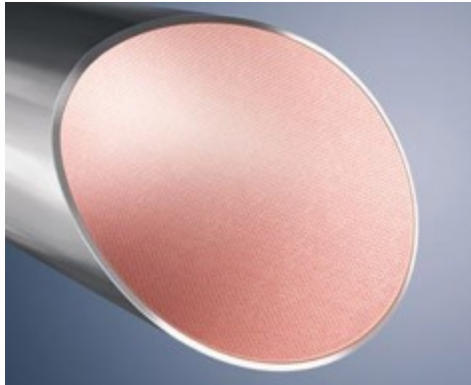


- General Conditions

What Liner-Class is the right?

Classification DIN EN ISO 11295	Load Condition DWA A 143-2	Impact from Inside	Impact from outside
Class A Fully statically loadable	Load Case II Old pipe does not bear in the long term	Inner Pressure Low Pressure	Water, Traffic, Soil
Class B, C semi-static loadable	Load Case I Old pipe is still load bearing	Inner Pressure Low Pressure	Outside Water Pressure

Types of Liners for Pressure Pipes



Fabric Hose
Very high Flexibility



Glass Liner
High Solidity



GRP Needle Felt Liner
Both Flexibility and Solidity

Technology Overview

	Fabric Hose	Needle Felt Liner	Liner with Fabric Hose Layer	GRP Needle Felt Liner	Glass Liner
Classification EN ISO 11295	C	A, B	A, B, C	A, B, C	A, B
DN-Range [mm]*	DN80-DN1200	DN100-DN1600	DN100-DN1000	DN100-DN1600	DN150-DN1500
Composite thickness [mm]*	2 to 5	4 to 30	4 to 25	5 to 15	4 to 15
Type of Resin	EP	EP, UP	EP	EP, UP	UP, VE
Installation Method	Inversion	Inversion, Combination of Dwaong-In / Inversion			Drawing-In
Curing Method	Heat Curing (Water / Steam) Ambient Temp.	Heat Curing (Water / Steam)			UV-Curing (Combination)
Bend Mobility (radienabhängig)*	≤ 45° (higher bends possible > 60 with limitations)				≤ 10°

Drawing-In, Curing Process

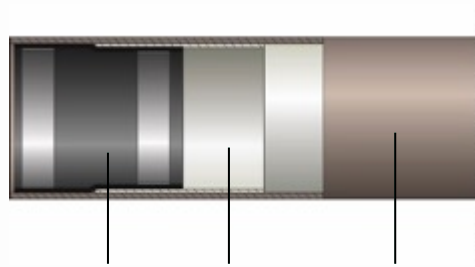


What is new about connection technologies of Pressure Pipe Liners?



Connection via the Old Pipe

Tip End of Old Pipe

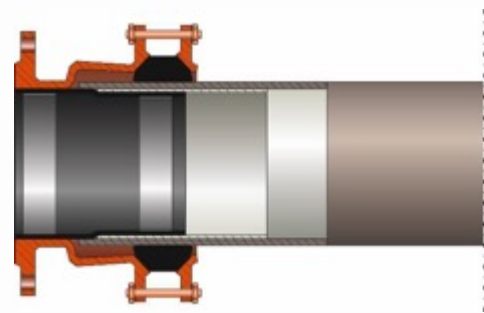


Liner end cuff Liner Old Pipe

Welded Flange



Multirange Clutch

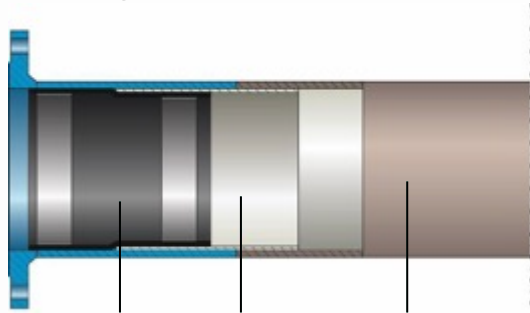


- End of old pipe is connecting element
- Cut back of liner in the old pipe and sealing by liner end cuff (can be waived at class C)



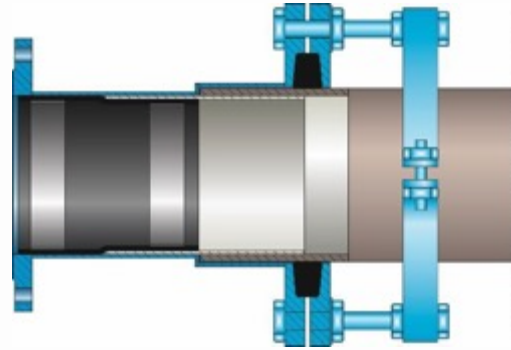
Connection via Fitting

New Pipe Element with Flange or Tip end



Liner end cuff Liner Old Pipe

Special Flange with pull-resistant coupling

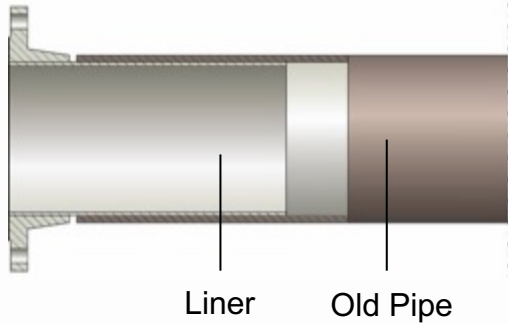


- Fitting of new pipe with same D_i placed before installation
- Cut back of liner via sealing by liner end cuff

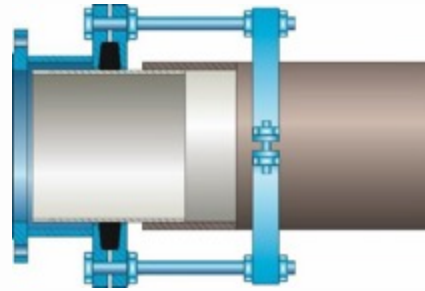


Connection via the Pressure Pipe Liner

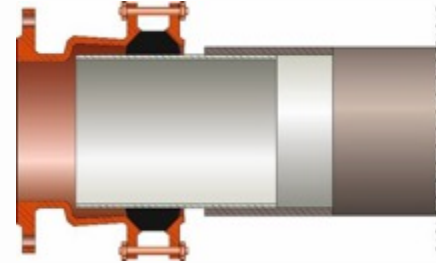
GRP Flange



Special Flange with pull-resistant coupling



Multirange Clutch



- For class A direct application of GRP flanges or mechanical couplings on the liner
- Sealing of the cut edge



Course of Renovation

Das Merkblatt liefert Vorgaben zu

- Baustellenablaufplanung,
- Vorbereitende Arbeiten,
- Installation des Liners,
- Abschließende Arbeiten.



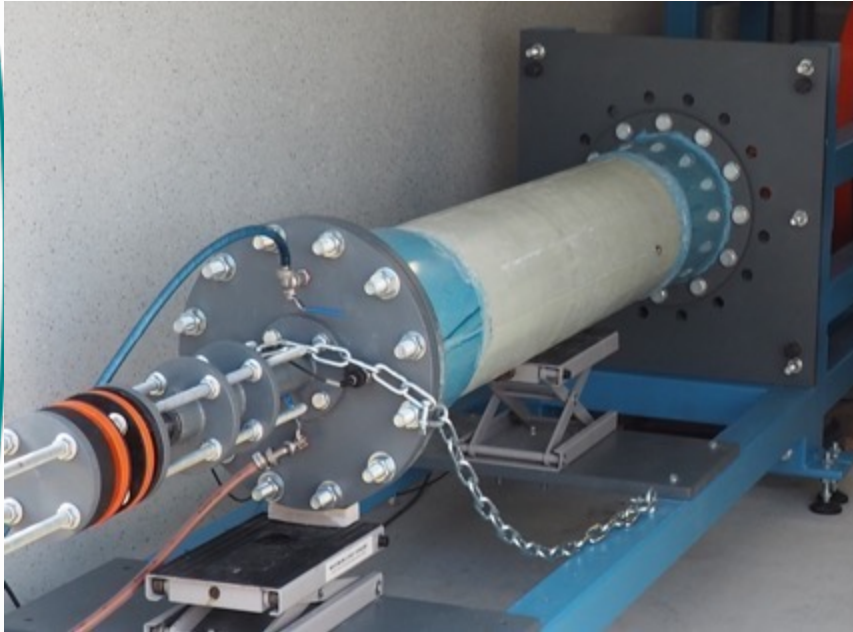
Wie gewinnen wir das Vertrauen der Auftraggeber?



Quality Control

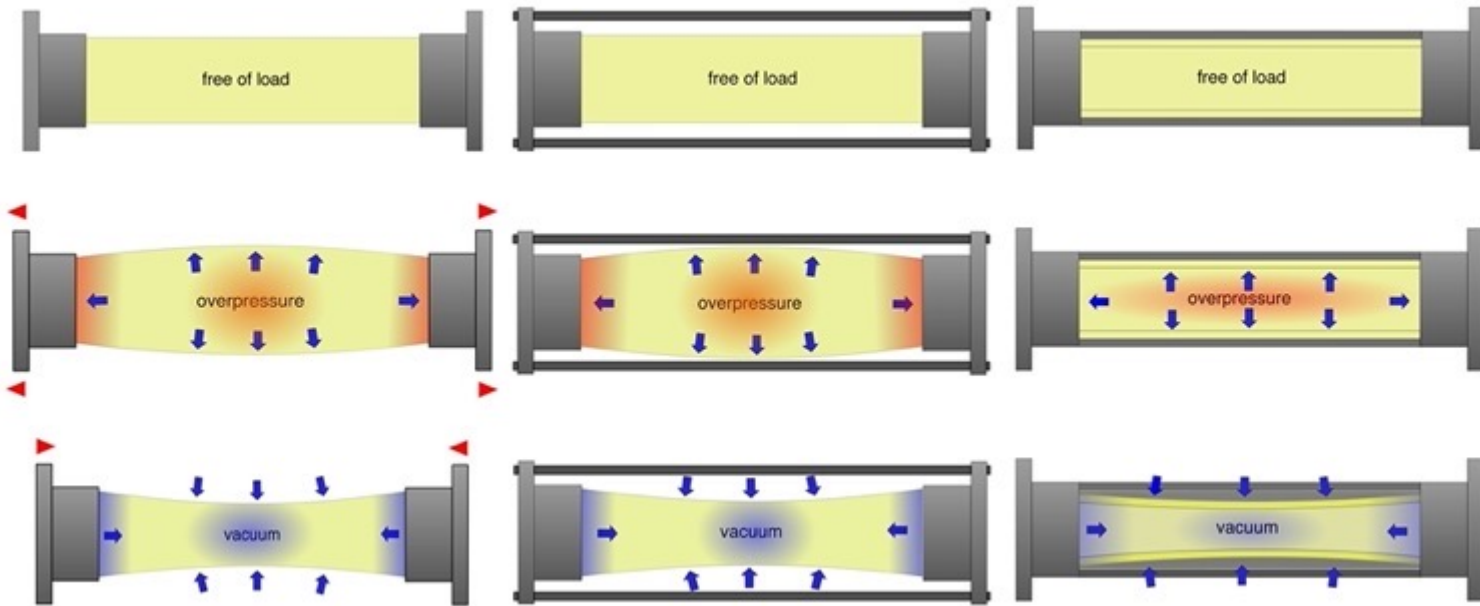
- Optical inspection
- Pressure Test
 - Class A and B: Pressure test according to EN 805 und DVGW-W 400-2
 - Class C: Pressure Test according to DVGW GW 327 (A)
- Material testing
 - Class A and B: Material testing of on-site-samples (Class A and B), Check of material properties according to DWA-A 143-3 (section 7.2)
 - Class C: Testing of Adhesion (peel test) according to DVGW GW 327

Prove of Suitability: Dynamic Load Test

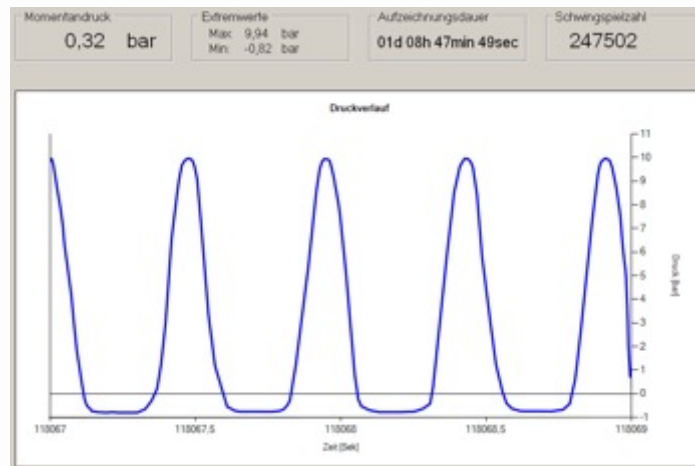
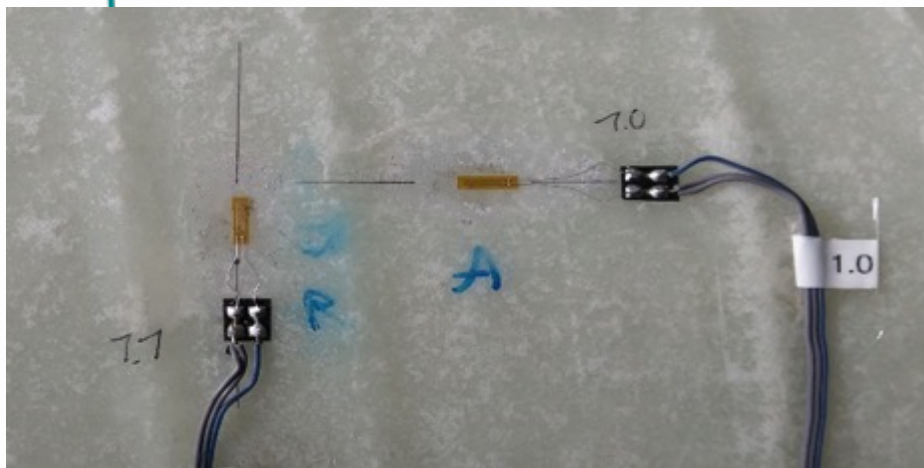


- Non destructive
- -0,9 bar underpressure to +10 bar overpressure (Medium: potable water)
- Frequency: 2 Hertz
- Procedure corresponds to ISO 15306 and DIN 50100
- **Norm DIN 3603 is to be published in 2022**

Options for Testing Procedures



Monitoring



Leaflet RSV 1.2 Pressure Pipe Renovation via CIPP



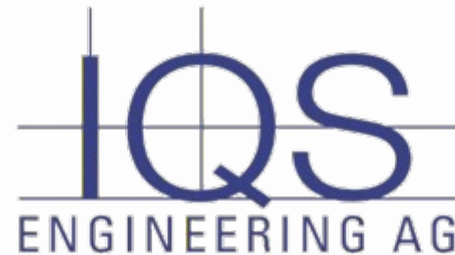
Free Download:



Fragen zum Merkblatt 1.2?

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