

04.90-PB 179/2011

TEST CERTIFICATE

Batch type test of reusable sealing elements (new valve design)

We hereby certify that sealing system product types

17.1 UA/V	L	50 – 250	from batch 195 /2011 onwards
20.1 ADE/V	L	25 – 150	from batch 195 /2011 onwards

manufactured by Wolf Kabeltechnik GmbH, of 70437 Stuttgart, Germany, on behalf of MaxCell Innerducts, USA, has fulfilled the requirements for sealing cable ducts and service entries in buildings against gas diffusion and temporarily accumulating water, after temperature cycling at -20°C and +30°C according to the following standard:

- Deutsche Telekom TS 0307/96 Sealing for cable-configured ducts

The certifying body has provided evidence in their Test Report No. 179 /2011 of the properties as shown below.

The sealing systems, which have undergone type-approval testing and quality control batch-type testing, fulfil the applicable national and international criteria.

The sealing systems are designed and manufactured to last an intended service life of at least 20 years, provided they are correctly installed in accordance with the manufacturer's instructions.

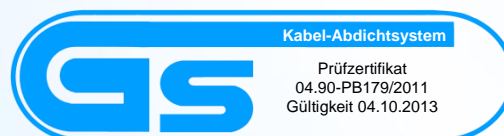
Applicable Test Report: FO 07 Part 14 PB 179/2011

Date of certification: 05.10.2011

This certificate is valid until 04.10.2013

Certificate No.

Date: 16.02.2012



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Sealing system



Sealing element



Sealing tape

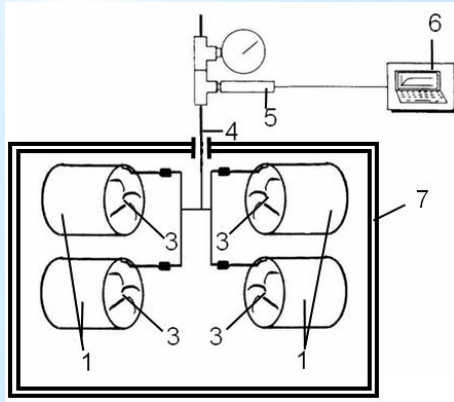
Requirements for the sealing system

Properties	Siemens AG Energy Sector	DVGW 601 Gas and water Parag. 4.10.5	Deutsche Telekom TS0307/96	DIN EN 0278-629 A1 ⁽³⁾ 61442 ⁽⁴⁾	Fibre Optics CT tested in acc. with FO 17-02 ...		
					PG1	PG2	PG4
Temperature resistance			Warming up / Cooling down rate 1°C/min				
T _{A1/t1}	+23°C/ > 7 d	-20°C/ ---	-15°C/ 5.25 h +30°C/ 5.25 h	+23 ± 3°C +85°C/ 4 h ⁽³⁾ +23±3°C/4h ⁽³⁾	-40°C/ 6 h +60°C/ 6 h	+60°C/60h	+60°C/60h
T _{B1/t1}	-29°C/ > 7 d						
T _{A2/t1}	+27°C/ 6 h – 7 d						
T _{B2/t1}	-32°C/ 6 h – 7 d						
T _{A3} momentary temperature	+36°C/ 6 h	+60°C/ ---		+55°C/ 4 h ⁽⁴⁾ +23°C / 3 h ⁽⁴⁾			
T _{B3}	-39°C/ 6 h						
Duration of cycle	-		12 h	8 h ⁽³⁾ / 8 h ⁽⁴⁾		60 h	60 h
No. of cycles	-		20	38 ⁽³⁾ 126 ⁽⁴⁾	16	1	1
Tightness of the sealing elements against ...			Tightness	≤ 0.35 bar ⁽²⁾	≤ 0.35 bar ⁽²⁾	≤ 0.35 bar ⁽²⁾	≤ 0.35 bar ⁽²⁾
Water ⁽⁵⁾	0.01 bar/ 1h 0.04 bar/ 24 h	----		< 0.1 bar/30min	----	≥ 0.1 bar ≤ 0.25 bar/ 60 min	≤ 0.25 bar/ 60 min
Gas diffusion ⁽⁵⁾		0.1 bar/ 30 min	0.5 bar/ Tightness	-----	----	≥ 0.1 bar ≤ 0.25 bar/ 60 min	
Chemical-mixtures pH2, pH12			Tightness 30 d	----	Tightness 30 d	Tightness 30 d	Tightness 30 d
Diesel, super and regular gasoline ⁽⁵⁾			Tightness 30 d	----	Tightness 30 d	Tightness 30 d	Tightness 30 d
Leak rate (service life)	---	---	< 4.4 x 10 ⁻⁶ mbarl/sec (138 mbarl/year)	---	< 5.5 x 10 ⁻⁸ mbarl/sec (2.7 mbarl/ year)		

FO Test specification 17-02 ...
 ... PG1 Tightness of the sealing elements
 ... PG2 Tightness of the cable sealing
 ... PG4 Installation and removal of the cable sealing (reusability)

(1) British Telecom requirement
 (2) Loss of pressure due to sealing cushion expansion
 (3) Test with heating rod EN 0278-629-1/A1
 (4) Test in heating chamber "ambient air" EN 61442
 (5) Temperature +23°C ± 3°C

Test setup Test specification FO17_02 PG1 Test No. 1346 V2 Temperature cycling



Test samples connected in series 179 D1/D2011

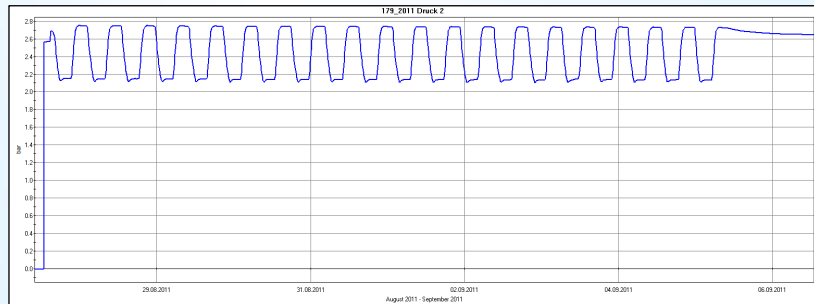
- 1 Pressure-resistant tube (cable duct)
- 2 Buckling-resistant duct or cable
- 3 Sealing element with valve
- 4 Connecting cable
- 5 Pressure transmitter, class 0.5 FSO IEC 60770
- 6 Measuring PC
- 7 Climate chamber IEC 60068-2-14

Test results

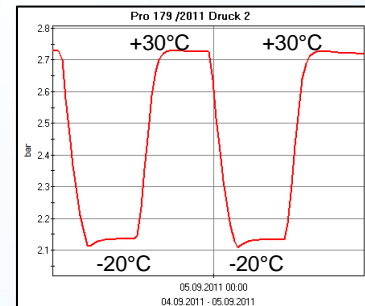
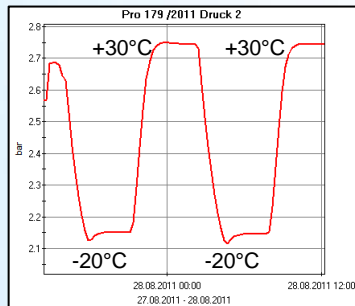
Exemplified in test samples Nos. 1 to 4

Test
Batch testing DIN ISO 9001 "new valve design"

Sealing element tightness
 (Samples as given in
 Sect. IV Table 1)
 Temperature cycling
 -20°C to +30°C
 (20 cycles)



Overpressure change
 in cable seal during
 temperature cycling



Requirement:

FO Test specification FO 17_02 PG 1 Test No. 1346 V2

Test result:

The test was passed successfully.
 Tightness of the sealing elements: 0.15 bar between initial and final values

FO 7 Part 14

Test Report No.: PB 179/2011

Quality control according to DIN ISO 9001

Batch testing of sealing elements (valve)
in temperature range -20°C to +30°C

Wolf / Maxcell Innerduct Batch Nos. 195 and Nr. 196/2011

Product: Reusable sealing cushion with valve,
Type ADE/V L 100-x
MaxCell MNo. MXCRTBVL100 / Wolf Art. No. 20.1 ADE /V L 100-x

Area of application: Delivery release according to DIN ISO 9001 "new valve design".
Sealing element for sealing cable ducts and service entries in
buildings against gas diffusion and temporarily accumulating
seepage water.

Client: Wolf Kabeltechnik GmbH, Zazenhäuser Str. 52, 70437 Stuttgart,
Germany

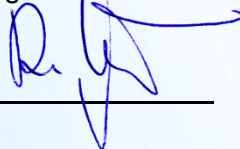
Test specifications:

- Based on Deutsche Telekom T-Com TS 0307/96 Abs. 4-6
Technical Specification "Sealing element for occupied cable ducts"
- Based on DIN 18195-1, 18195-5 and 18195-6: August 2000
"Waterproofing of buildings"
- Fibre Optics CT GmbH
Test specification FO17_02 PG1 Test No. 1346 Method 2

Stuttgart, 05.10.2011

Fibre Optics CT GmbH
Zazenhäuser Str. 52
70437 Stuttgart
Germany

Project planning:
Managing director



Mechanical and dynamic
measuring technology:



Random inspection of testing and measuring processes
carried out by TÜV SÜD Industrie Service GmbH

21.09.2011