



**DANISH
TECHNOLOGICAL
INSTITUTE**

AVK International A/S
Attn.: Lars Sindal Jensen
Bizonvej 3
Skovby
DK6484 Galten
Denmark

Teknologiparken
Kongsvang Allé 29
8000 Aarhus C
Denmark
Phone +45 72 20 20
info@dti.dk
www.dti.dk

4 July 2016

Confirmation of witness test of Supa Lock connections

Dear Sir

This document confirm:

1. The AVK Supa Lock 32 mm non-thread connection fulfils the requirements of the tightness test defined below
2. DTI has witnessed the execution of tightness testing in the premises of AVK TECH in Galten, Denmark.

The test result is valid for the joint as integrated part in any fitting as long as the jointing dimensions and materials are the same.

The full description and report of the testing can be found in the AVK test report.

*AVK Holding / Tech Test report
Supa Lock™
Prototype test with certification
May 2016*

DTI witnessed the full vacuum and internal pressure test as well as start up and finish of the 24,000 cycle test.

Further the logged test data were carefully inspected for pressure, time and number of cycles.

The cycle time as well as the low and high pressure were within normally accepted tolerances.

The number of cycles were significantly over the required minimum 24,000.

The test was carried out according to the tightness requirements in EN 545 and EN 14525.

The manometers used were calibrated according to AVK procedures.

DTI confirm that the description of the test pieces, the execution of the test and the results reported in the test sheet signed by DTI are correct.

Best regards,

Vagn Salling Poulsen, Consultant, Installation and Calibration
Mobile +45 72 20 24 56

vasp@teknologisk.dk

Danish Technological Institute
Energy and Climate
Teknologiparken, Kongsvang Alle 29
DK-8000 Aarhus C
Denmark

AVK Holding / TECH Test report



Supa Lock™

Prototype test with certification

May 2016

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Project description

Prototype test of Supa Lock™ DN32 connection according to Test Sheet Rev.No.03 and Qualification Test as found in this report. Test is performed with DTI (Danish Technological Institute) as witness. DTI is a certified independent institute, more info can be found on www.dti.dk.

The tests are defined in order to check critical functions as a basic requirement for prototype approval.

The Supa Lock™ product range is designed with socket and spigot ends. As the socket/spigot is identical for all products in the range, random products were chosen for testing

The spigot end can either be in ductile iron (coated) or brass (un-coated). The socket end is in ductile iron (coated).

Products used for test:

Item no. 1090801032064 - Spacer DN80 with 2 x SL32 outlets, mounted with standard blind flanges

Item no. 10600302324 – Threaded connector of brass SL32 / Pr. 1 ¼"

Item no. 1060000032464 - Blind plug SL32

Product specification

Threadless connection system DN32.

Socket ends in ductile iron, and spigot ends in brass or ductile iron.

All ductile parts coated with 250 to 450 micron to ensure functionality and tightness.

Sealing between socket and spigot consists of two Ø7 mm O-rings, securing 100 % and durable tightness.

Lock of spigot in socket when installed is secured by specially designed safety retainer in POM.

Test

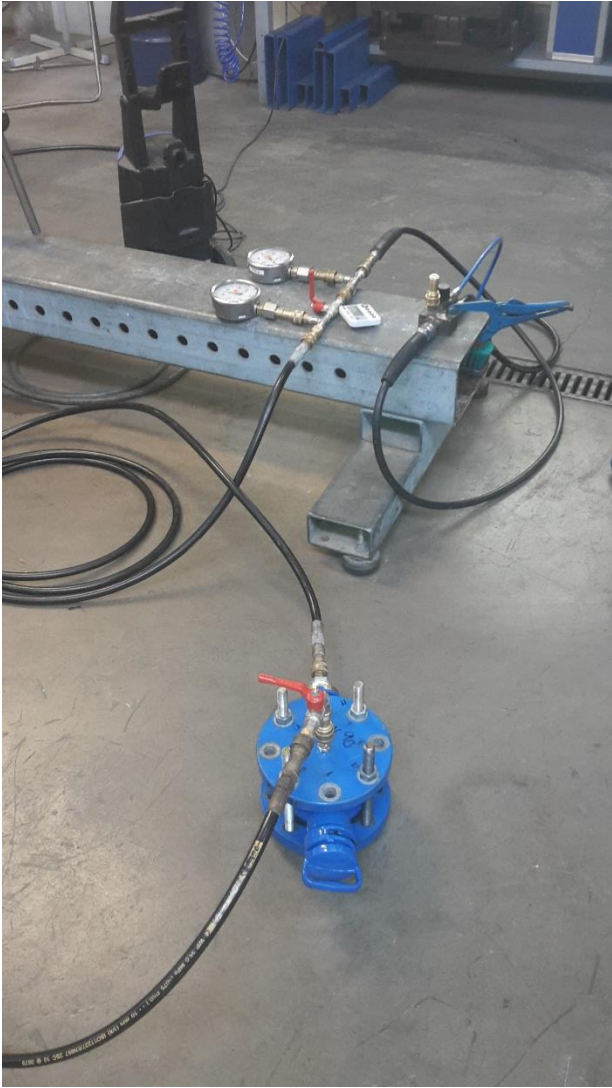
Supa Lock™ DN32 prototype tests according to 04.063 Qualification Test Report Test Sheet rev.3, performed to prove function.



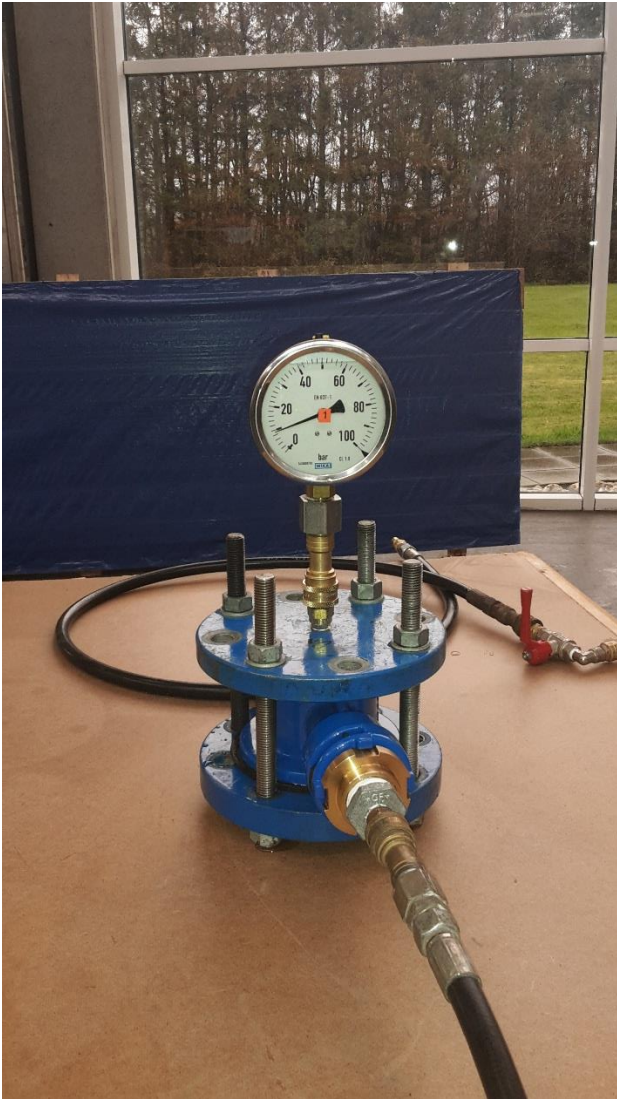
Vacuum test start.



DTI inspection during vacuum test.



48 bar / 2 hour test.



24.000 cycle test 9 Bar (low) to 18 Bar (high) pressure with 5 sec. hold time.
Data logged in PLC for verification of pressure, time and number of cycles.



DTI verifies test set-up and data logging.

Comments

All Items used for test are from first production / prototype batch.
Produced and coated according to agreed specifications and drawings.
POM safety retainer is from 0-series production.

Conclusion

All tests agreed for Supa Lock™ passed without any comments.

Test sheet

Workshop test sheet, documented and signed by DTI.

AVK/JEM 26-Apr.-2016 Rev.No.03

SUPA LOCK Test sheet.

Test no.	Media	Pressure Bar	Test/Time	Condition/ Temperature	Description	Actual Pressure at start of test	Actual Pressure at end of test	Passed	Failed	Date	Sign.
1	Vacuum	-0,8	2 Hour	Room temp.	Maximum pressure change: 0,08 bar.	-0,8	-0,798	X		27/4-16	[Signature]
2	Water	48	2 Hour	Room temp.	No leakage 5 Sec. Hold time.			X		27/4-16	[Signature]
3	Water	9 til 18	24.000 Cycle	Room temp.	No leakage			X		27/5-16	[Signature]

Test setup:

- 1 Spacer DN80 with blind flanges.
- 1 Thread Adaptor.
- 1 Blind Plug.

- Item No.: 1090801032064 Description: SPACE 80 WITH 2xSL OUT PN10/16
- Item No.: 10600302324 Description: FIT.ADAP. BRASS SL32/Rp 1 1/4"
- Item No.: 1060000032464 Description: SUPA LOCK BLIND CAP DN32

DTI audit.

- Day one: Perform Test no. 1, 2 + start Test no.3
- Day two: Shut down of Test no. 3 + sign off/report.

Tests partial according to EN545 and EN14525

Tests witnessed and result confirmed by
Danish Technological Institute.

Date: 27/5-16
 Name: [Signature]

Danish Technological Institute
 Energy and Climate
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 Denmark