

Inspection Report No.: 416.375-1k Date: 2015-11-09

Air valves for water and drinking water pipelines in the dimensions DN 15 up to DN 300

Client: A.R.I. Flow Control Accessories Ltd.
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ISRAEL

Subject: Air valves for water and drinking water pipelines in the dimensions DN 15 up to DN 300

Task: Audit Test according to EN 1074-1:2000 and EN 1074-4:2000 for the inspection period 2015

Order: Ordered by inspection contract

Date of sampling: 2015-08-03

Location of sampling: Kibbutz Kfar Charuv (IL)

Receipt of samples: 2015-08-14

Ref: DI Papp / DI Mac



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Non-accredited procedures applied
have been named as such.

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1 SCOPE OF WORK

According to the inspection contract air valves for water and drinking water pipelines in the dimension DN 15 up to DN 300 had been subjected to an Audit Test (AT) according to the standards EN 1074-1 and EN 1074-4.

Due to the identity in construction the products are classified into the following families:

- D-040 Family including the types D-040, D-040-B, D-040-P, D-040-C, D-040-Mini, DT-040 Micro, D-43; D-46 and D-090

Type	DN Range	PN	Description
D-040	20, 25, 50	16	PA-GF
D-040-B	50	16	PA-GF
D-040-P	20, 25, 50	16	PA-GF
D-040-C	20, 25, 50	16	PA-GF
D-040-Mini	20, 25	16	PA-GF
DT-040-Micro	15, 20	10	PA-GF
D-43	50	10	PP
D-43	50	16	PA-GF
D-43	75 - 200	16	Cast iron, coated
D-46	50 - 200	16	Cast iron, coated
D-090	50 - 80	16	Cast iron, coated

- D-050 Family including the types D-050, D-052, D-050-C, K-010, K-012, K-014 and K-016

Type	DN Range	PN	Description
D-050	50 - 250	16	Cast iron, coated
D-050-C	50 - 250	16	Cast iron, coated
D-052	50 - 250	25	Cast iron, coated
K-010	50 - 250	16	Cast iron, coated
K-012	50 - 250	25	Cast iron, coated
K-014	50 - 250	25	Cast iron, coated
K-016	50 - 250	25	Cast iron, coated

- D-060 Family including the types D-060, D-060-C, D-060-HF, D-060-NS, K-060, K-062, K-062-HF

Type	DN Range	PN	Description
D-060	50 - 250	16	Cast iron, coated
D-060-C	50 - 250	16	Cast iron, coated
D-060-HF	50 - 250	16	Cast iron, coated
D-060-NS	50 - 250	16	Cast iron, coated
D-062	50 - 250	16	Cast iron, coated
K-060	50 - 250	16	Cast iron, coated
K-062	50 - 250	25	Cast iron, coated
K-062-HF	50 - 250	25	Cast iron, coated

- D-070 Family including the types D-070, D-070-I, D-070-M1 and D-070-P

Type	DN Range	PN	Description
D-070	80, 100, 150, 200	16	Cast iron, coated
D-070-M1	100, 150, 200, 300	16	Cast iron, coated
D-070-I	50	10	PA-GF
	80, 100, 150, 200	16	Cast iron, coated
D-070-P	50	10	PA-GF
D-070-P M1	80	10	PA-GF
D-070-P M2	100	10	PA-GF

- S-050 Family including the types S-050, S-050-C, S-052, S-012, S-014 and S-016

Type	DN Range	PN	Description
S-050	15, 20, 25	16	PA-GF, brass base
S-50-C	15, 20, 25	16	brass base
S-052	15, 20, 25	25	brass base



2 SCOPE OF APPLICATION

The results given in this test report have been obtained under the specific conditions of the individual tests. They shall serve as a proof for the client of the conformity of those samples tested according to the requirements of the product standard(s) given.

3 SAMPLE MATERIAL

3.1 SAMPLING PROCESS

The samples listed in table 1 had been chosen randomly by Udo Pappler of OFI Technologie & Innovation GmbH (subsequently OFI) in Kibbutz Kfar Charuv (IL) on 2015-08-03.

The procedure of sampling and marking was in accordance with OFI -internal SOP 116.013 „Sampling“ and SGS-process No. J13.0486.9140.312 (Annex 1, comprises 1 page). The samples in table 1 had been submitted by the client to OFI.

Table 1: Test specimen

Sample	Test specimen
1	Pat Pend PA PN 16 DN 25 07/2012
2	D-050-HF DN 50 PN 16 S/N 1107492 01/2015
3	D-060-C-NS DN 50 PN 16 S/N 1047793 11/2013
4	C-5802-01 DN 20 100728

3.2 DESCRIPTION OF PRODUCTS

The air valves produced by the client are depending on the type of product consisting of a cast iron body, which is coated with a polyester resin coloured blue or of a plastic body out of glassfibre reinforced polyamide (PA)

The floating lever can be a sphere out of polycarbonate (PC), a sphere of stainless steel (SS) or a defined geometrical body out of foamed polypropylene (PP). Beside these main parts there are certain elastomeric sealing rings or parts in various sizes and geometrical characteristics.

4 TESTS

The tests were carried out from 2015-08-14 to 2015-11-09 in the individual technical departments within the scope of competence of the authorised signatories according to the OFI QM manual.

4.1 DESIGN REQUIREMENTS

The design requirements had been chosen from section 4 of EN 1074-4. According to the observations in section 4.1.1 up to 4.1.11 of this test report, the requirements in section 4 of EN 1074-4 are fulfilled.

4.1.1 MATERIALS

4.1.1.1 COMPONENTS AND COATING MATERIALS

The body of the air valves is produced, depending on the type of product, out of

- cast iron with a coating based on blue coloured polyester resins RESICOAT RT9000 R4 of the producer Akzo Nobel,
- polyamide (PA 66) in the float lever Plustek Pa 3003 G6NT-N of the producer DuPont

Other materials in contact with drinking water are:

- Polycarbonate (PC) in the float lever MAKROLON 3107 of the producer BAYER
- Polypropylene (PP) CAPILENE R50 of the producer Carmel Olefins
- EPDM EP7118F rubber of the producer Xiamen Maifeng Seal Products
- NBR N7118F rubber of the producer Xiamen Maifeng Seal Products
- Brass (CuZn40Pb2)

4.1.1.2 ELASTOMERS

The elastomeric materials are complying with the requirements in EN 681-1. Certificates of conformity according to EN 10204 are provided by the distributors of those materials.

4.1.2 NOMINAL DIAMETER (DN)

The values of the nominal diameter (DN) are those given in EN 805.

4.1.3 NOMINAL PRESSURE (PN)

The values of the nominal pressure (PN) are designed in such a way, so that the characteristic pressures of the air valves (PFA, PMA and PEM) are those in table 1 of the EN 1074-1. The products show values of PN 10, PN 16 and PN 25.

4.1.4 TEMPERATURES

The air valves are designed for a service temperature range of 0 °C up to 60 °C and a storage temperature range of -20 °C up to 70 °C. Because those valves produced out of plastic (PP) have a temperature-dependent mechanical behaviour, the PN values given on these products are established at 20 °C. No derating factor is given by the manufacturer.

4.1.5 DESIGN

The design of the air valves is ensuring a safety factor against short and long term rupture. The design was established on calculation methods and was checked by the auditor during the audit at the production site.

4.1.6 END TYPES AND INTERCHANGEABILITY

Flanges of the valves are in accordance with EN 1092-2.

4.1.7 OPERATING DIRECTION

Not applicable, because the valves are not installed in line (Only one port).

4.1.8 MAXIMUM WATER VELOCITY

The air valves are designed for maximum water velocities of 3 m/sec for products with PN 10, with 4 m/sec for products with PN 16 and with 5 m/sec for products with PN 25. These mentioned values are in accordance with table 2 of EN 1074-1.

4.1.9 MATERIALS IN CONTACT WITH DRINKING WATER

Those organic materials, permanently in contact with drinking water, had been qualified according to the KTW-reglementations ("cold water test") and for those with a larger surface-volume-ratio according to DVGW W 270. All the requirements are fulfilled.

4.1.10 INTERNAL CORROSION AND AGEING RESISTANCE

Because of the selected material, that are in contact with water (see section 4.1.1.1 of this report) a sufficient resistance against internal corrosion and ageing is realized.

4.1.11 EXTERNAL CORROSION AND AGEING RESISTANCE

Because of the selected material, that are in contact with water (see section 4.1.1.1 of this report) a sufficient resistance against external corrosion and ageing is realized.

4.2 PERFORMANCE REQUIREMENTS

The performance requirements had been chosen from section 5 of EN 1074-4. According to the observations in section 4.2.1 up to 4.2.7 of this test report, the requirements in section 5 of EN 1074-4 are fulfilled.

4.2.1 MECHANICAL STRENGTH - RESISTANCE TO INTERNAL PRESSURE

The resistance against internal pressure of the shell and the other pressure containing components were tested at (23 ± 2) °C with water according to section 5.1.1 and Annex A of EN 1074-1. For the testing pressure the higher value of PEA or $1,5 * PFA$ was chosen after the air valves had been vented. The testing time was 12 min. The results are summarized in table 2.

Table 2: Resistance against internal pressure

Sample	Pressure in bar	Observation
1	25	No leakage or other defect during testing time
2	25	No leakage or other defect during testing time
3	25	No leakage or other defect during testing time
4	37.5	No leakage or other defect during testing time

4.2.2 MECHANICAL STRENGTH - RESISTANCE TO DIFFERENTIAL PRESSURE

The requirement is fulfilled by the conformance to section 5.1.1 of EN 1074-4.

4.2.3 MECHANICAL STRENGTH - RESISTANCE TO BENDING

Not applicable.

4.2.4 MECHANICAL STRENGTH - RESISTANCE TO OPERATING LOADS

Not applicable.

4.2.5 LEAKTIGHTNESS TO INTERNAL PRESSURE

The requirement is fulfilled by the conformance to section 5.1.1 of EN 1074-4.

4.2.6 LEAKTIGHTNESS TO EXTERNAL PRESSURE

Not applicable.

4.2.7 LEAKTIGHTNESS – SEAT TIGHTNESS AT HIGH AND LOW PRESSURE

The seat of the valves was fully closed, filled with water and vented. After that a differential pressure equal to $1.1 \cdot PFA$ and 0,5 bar at a temperature of $(23 \pm 2) \text{ }^\circ\text{C}$ was applied. The test parameters and results are shown in table 3. The requirements of EN 1074-4 are fulfilled. The leakage rate is defined in section A.4.3 of EN 12666-1.

Table 3: Seat tightness at high and low pressure

Sample	Pressure in bar	Testing time in min	Leakage Rate
1	17.6	10	A
	0.5		A
2	17.6		A
	0.5		A
3	17.6		A
	0.5		A
4	27.5		A
	0.5		A

4.2.8 MAXIMUM OPERATING TORQUE (MOT)

Not applicable.

4.2.9 AIR FLOW CHARACTERISTICS – AIR RELEASE, AIR INTAKE FUNCTION

The hydraulic air flow characteristics are given in the catalogues of the manufacturer. The air release and the air intake function was checked at a temperature of (23 ± 2) °C according to the Annex A and Annex B of EN 1074-4. The measured values on the valves (samples 1, 2, 3 and 4) are within a range of 10 % of the data given by the manufacturer.

4.2.10 RESISTANCE TO DISINFECTION PRODUCTS

The resistance to disinfection products was tested according to section 5.4 and Annex E of EN 1074-1 at a temperature of (23 ± 2) °C. The test solution was an aqueous solution of NaOCl, containing active chlorine with a concentration of 50 mg/l.

The valves had been closed at the threads of flanges, filled with the test solution and stored for a period of 48 h. After that the valves had been emptied and subjected to the seat tightness test against high and low pressure (section 5.2.2 of EN 1074-1). The test parameters and results are shown in table 4. The requirements of the EN 1074-4 are fulfilled.

Table 4: Seat tightness at low and high pressure after storing in a disinfection product

Sample	Pressure in bar	Testing time in min	Leakage Rate
1	17.6	10	A
	0.5		A
2	17.6		A
	0.5		A
3	17.6		A
	0.5		A
4	27.5		A
	0.5		A

4.2.11 ENDURANCE OF VALVES WITH AIR INTAKE, AIR RELEASE FUNCTION

The endurance of the valves was tested at a temperature of (23 ± 2) °C by subjecting them to 250 consecutive cycles of filling and draining in accordance with Annex C on EN 1074-4.

The pressure was varying between atmospheric (1 bar) and PFA (16 bar resp. 25 bar). The pressure of 16 bar resp. 25 bar was maintained for at least over a period of 2 min. The test parameters and results are shown in table 5. After testing the endurance the test according to section 5.2.1 and 5.2.2 of EN 1074-4 had been executed. The requirements of EN 1074-4 are fulfilled.

Table 5: Endurance

Sample	Minimum pressure in bar	Maximum pressure in bar	Number of cycles	Observation
1	1	25	2 500	No leakage
2	1	25	2 500	No leakage
3	1	25	250	No leakage
4	1	37.5	2 500	No leakage

4.2.12 LONG TERM UNSEATING TEST

Not applicable.

4.2.13 CONTROL OF PRODUCTION PROCESS AND QUALITY SYSTEM

The manufacturer is controlling the quality of his products according to EN 1074-4 and section 5 of DVGW VP 646. The quality management system is certified according to ISO 9001 (see Annex 2, contains 1 page). The characteristics of the products like marking, surface and leak tightness are checked on 100 % of the products.



4.3 MARKING

The marking is according to section 7 of EN 1074-4 and including following information:

For valves smaller then DN 50:

- ✓ EN 1074-4
- ✓ Manufacturer's information
- ✓ Nominal Pressure (PN)

For valves up to and equal then DN 50:

- ✓ EN 1074-4
- ✓ Manufacturer's information
- ✓ Nominal Pressure (PN)
- ✓ Nominal Diameter (DN)
- ✓ Material
- ✓ Production year

4.4 PACKAGING

Valves in smaller dimensions are packaged in plastic bags; products in larger dimensions are protected with wood or plastic material in an appropriate way, to protect the products against mechanical damage caused during storage or transport.

5 RESULTS

The air valves for water and drinking water pipelines fulfil all the requirements of the Audit Test (AT) according to the standards EN 1074-1 and EN 1074-4.

This inspection report no. **416.375-1k**

comprises 12 sheet(s) 5 table(s), 0 figure(s), 2 Annex(es).

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