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Test of filters

(9 appendices)

Work requested

At the request of Lintec Sweden, SP has tested the initial pressure drop and the initial particle efficiency.

Test items

- Lintec art no. LR77KPF
- Lintec art no. LR77K
- Lintec art no. LP77K
- Lintec art no. LR100C
- Lintec Yellowline art no. LY75
- Lintec Jetline art no. LJ77C
- Green Cotton art no. CA275
- JR art no. FC-07505
- K&N art no. RR-3001

All items were in good condition at the arrival to SP.

Test methods

The tests were carried out in a filter rig. The filters were connected to a duct with same diameter as the opening of the filter to be tested. The initial pressure drop was measured at air flow rates of 200, 300, 400 and 500 m³/h. The initial particle efficiency was measured with respect to DEHS-aerosol with an optical particle counter (particle sizes 0,24-2,45 µm) at an air flow of 250 m³/h.

Results

The pressure drop can be expressed as the static pressure drop or the total pressure drop. The static pressure drop is the measured pressure difference between the static pressure upstream and downstream the filter. The total pressure drop is a calculated value where the static pressure drop is corrected with respect to the pressure drop caused by friction losses and to the dynamic pressure difference between the filter and the measuring point in the duct.

The air data during the tests was 990 mbar, 23 °C and 54 %-RH. Test results are valid only for the items tested.

Table 1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
LR77KPF	145	293	514	790
LR77K	158	315	540	822
LP77K	363	746	1291	-
LR100C	75	148	245	368
LY75	93	198	346	537
LJ77C	320	652	1120	1383
CA275	196	410	734	1140
FC-07505	165	337	588	898
RR-3001	157	318	542	835

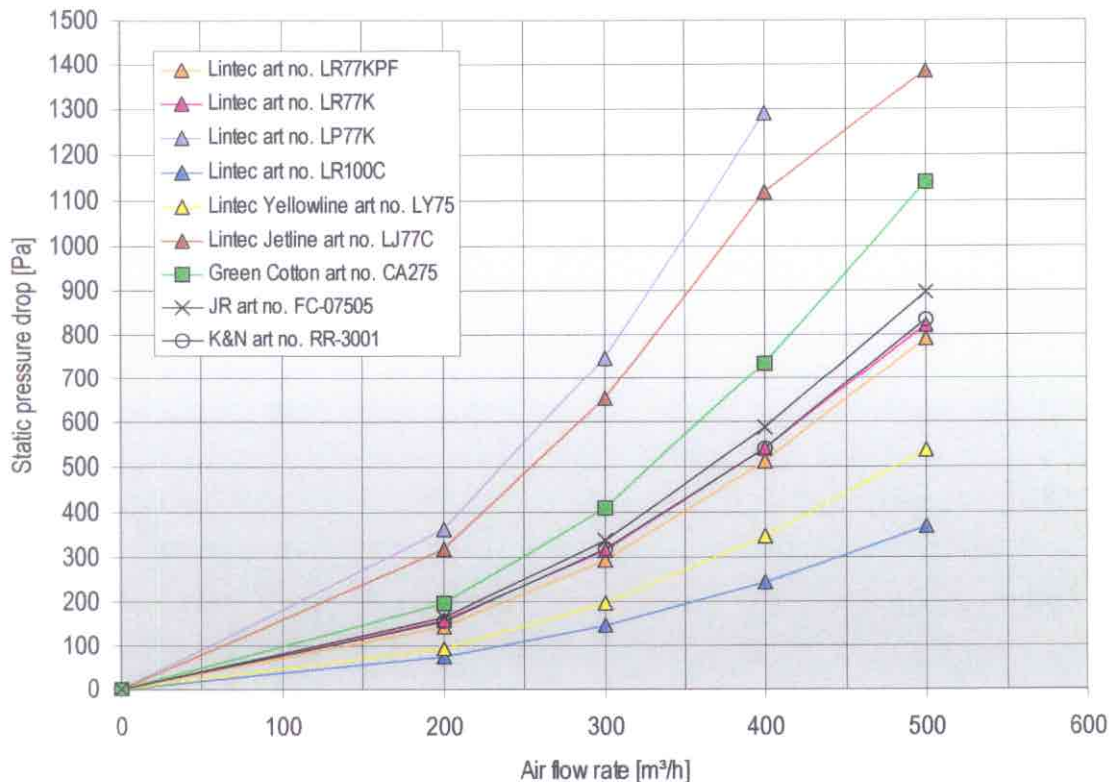


Diagram 1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Table 2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
LR77KPF	57	94	161	234
LR77K	70	116	187	266
LP77K	275	548	941	-
LR100C	37	63	95	130
LY75	55	113	196	300
LJ77C	232	454	769	936
CA275	107	211	382	587
FC-07505	76	138	235	342
RR-3001	68	119	189	280

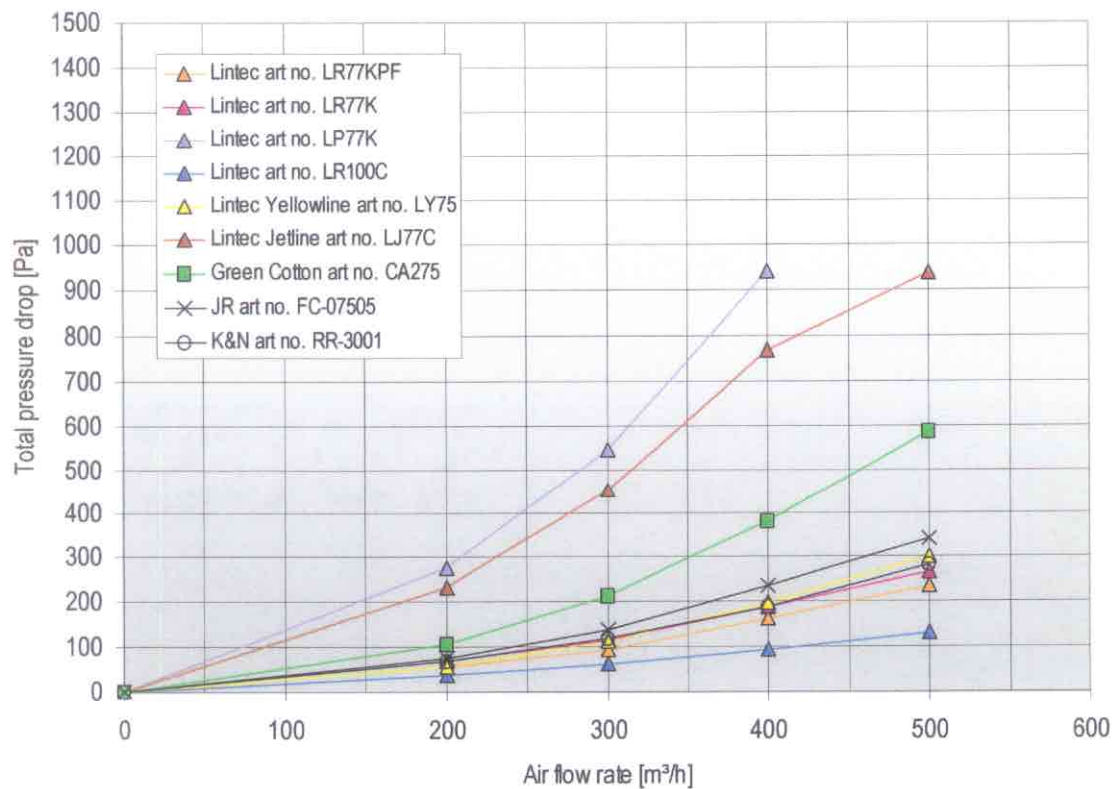


Diagram 2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Table 3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.

	0,24 µm	0,39 µm	0,59 µm	0,84 µm	1,41 µm	2,45 µm
LR77KPF	5,0	5,3	8,4	14,9	25,1	43,0
LR77K	4,5	4,8	9,2	21,2	41,7	76,1
LP77K	16,2	40,5	74,6	90,4	96,5	99,1
LR100C	5,0	5,1	7,4	13,2	30,4	63,4
LY75	3,7	6,4	13,4	24,8	40,0	65,7
LJ77C	12,9	32,3	67,1	87,4	95,1	98,6
CA275	3,1	4,9	8,7	19,0	36,5	58,4
FC-07505	4,6	6,3	12,2	23,6	40,7	68,1
RR-3001	4,6	4,9	11,3	19,0	34,2	64,8

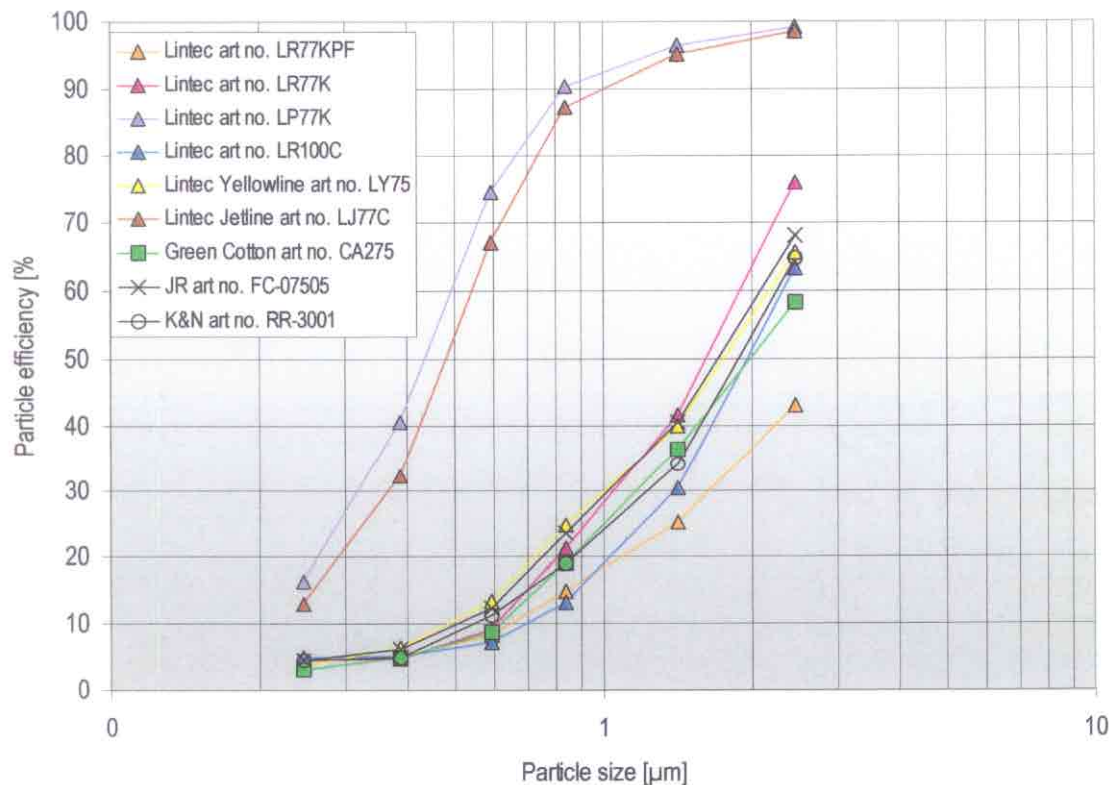


Diagram 3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.


Instrumentation

- Druck DPI 260, SP's inventory no. 201 637
- Testo H1, SP's inventory no. 202 417
- Furness FC016, SP's inventory no. 202 587
- Furness FC016, SP's inventory no. 202 588
- Furness FC012, SP's inventory no. 201 690
- Furness FC012, SP's inventory no. 201 691
- Diluter Palas VKL-10, SP's inventory no. 201 714
- Auto sampler, SP's inventory no. 201 455
- Lasair 210, SP's inventory no. 202 593


Measurement uncertainty

- Air flow $\pm 5 \%$
- Static pressure drop $\pm 3 \%$
- Total pressure drop $< 10 \text{ Pa}$
- Particle efficiency $\pm 0.1 \cdot$ penetration value [%]

SP Swedish National Testing and Research Institute Energy Technology, Ventilation and Indoor Climate



Geron Johansson
Technical Manager



Linda Ericson
Technical Officer

Appendices

- Appendix 1. Results - Lintec art no. LR77KPF
- Appendix 2. Results - Lintec art no. LR77K
- Appendix 3. Results - Lintec art no. LP77K
- Appendix 4. Results - Lintec art no. LR100C
- Appendix 5. Results - Lintec Yellowline art no. LY75
- Appendix 6. Results - Lintec Jetline art no. LJ77C
- Appendix 7. Results - Green Cotton art no. CA275
- Appendix 8. Results - JR art no. FC-07505
- Appendix 9. Results - K&N art no. RR-3001

Results - Lintec art no. LR77KPF

The results are valid only for the item tested.

Table A1-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	145	293	514	790

Table A1-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	57	94	161	234

Table A1-3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.

Particle size	0,24 µm	0,39 µm	0,59 µm	0,84 µm	1,41 µm	2,45 µm
Particle eff.	5,0	5,3	8,4	14,9	25,1	43,0

Results - Lintec art no. LR77K

The results are valid only for the item tested.

Table A2-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	158	315	540	822

Table A2-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	70	116	187	266

Table A2-3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.

Particle size	0,24 µm	0,39 µm	0,59 µm	0,84 µm	1,41 µm	2,45 µm
Particle eff.	4,5	4,8	9,2	21,2	41,7	76,1

Results - Lintec art no. LP77K

The results are valid only for the item tested.

Table A3-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	363	746	1291	-

Table A3-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	275	548	941	-

Table A3-3. Initial particle efficiency [%] at different particle sizes [μm], air flow rate 250 m³/h.

Particle size	0,24 μm	0,39 μm	0,59 μm	0,84 μm	1,41 μm	2,45 μm
Particle eff.	16,2	40,5	74,6	90,4	96,5	99,1

Results - Lintec art no. LR100C

The results are valid only for the item tested.

Table A4-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	75	148	245	368

Table A4-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	37	63	95	130

Table A4-3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.

Particle size	0,24 µm	0,39 µm	0,59 µm	0,84 µm	1,41 µm	2,45 µm
Particle eff.	5,0	5,1	7,4	13,2	30,4	63,4

Results - Lintec Yellowline art no. LY75

The results are valid only for the item tested.

Table A5-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	93	198	346	537

Table A5-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	55	113	196	300

Table A5-3. Initial particle efficiency [%] at different particle sizes [µm], air flow rate 250 m³/h.

Particle size	0,24 µm	0,39 µm	0,59 µm	0,84 µm	1,41 µm	2,45 µm
Particle eff.	3,7	6,4	13,4	24,8	40,0	65,7

Results - Lintec Jetline art no. LJ77C

The results are valid only for the item tested.

Table A6-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	320	652	1120	1383

Table A6-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	232	454	769	936

Table A6-3. Initial particle efficiency [%] at different particle sizes [μm], air flow rate 250 m³/h.

Particle size	0,24 μm	0,39 μm	0,59 μm	0,84 μm	1,41 μm	2,45 μm
Particle eff.	12,9	32,3	67,1	87,4	95,1	98,6

Results - Green Cotton art no. CA275

The results are valid only for the item tested.

Table A7-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	196	410	734	1140

Table A7-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	107	211	382	587

Table A7-3. Initial particle efficiency [%] at different particle sizes [μm], air flow rate 250 m³/h.

Particle size	0,24 μm	0,39 μm	0,59 μm	0,84 μm	1,41 μm	2,45 μm
Particle eff.	3,1	4,9	8,7	19,0	36,5	58,4

Results - JR art no. FC-07505

The results are valid only for the item tested.

Table A8-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	165	337	588	898

Table A8-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	76	138	235	342

Table A8-3. Initial particle efficiency [%] at different particle sizes [μm], air flow rate 250 m³/h.

Particle size	0,24 μm	0,39 μm	0,59 μm	0,84 μm	1,41 μm	2,45 μm
Particle eff.	4,6	6,3	12,2	23,6	40,7	68,1

Results - K&N art no. RR-3001

The results are valid only for the item tested.

Table A9-1. Static initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	157	318	542	835

Table A9-2. Total initial pressure drop [Pa] at different air flow rates [m³/h]

Air flow rate	200 m ³ /h	300 m ³ /h	400 m ³ /h	500 m ³ /h
Pressure drop	68	119	189	280

Table A9-3. Initial particle efficiency [%] at different particle sizes [μm], air flow rate 250 m³/h.

Particle size	0,24 μm	0,39 μm	0,59 μm	0,84 μm	1,41 μm	2,45 μm
Particle eff.	4,6	4,9	11,3	19,0	34,2	64,8