Investigation report

Studies on the cleaning performance of a Brink KWL/Freshlight Ionstar filter unit

("Pure Induct")

DMT-Report number: APS 2 – 00 032 20

1	**Client**	Brink Climate Systems BV Postbus 11 7950 AA Staphorst Netherlands
2	**DMT Report number**	8117920653-10
3	**Period of the examinations**	March – April 2020
4	**Subjects of the investigation**	Brink KWL filter unit ("Pure Induct") for a nominal air volume flow of 300 m³ / h / Freshlight ionstar
5	**Task**	Determination of the separation performance against: ● Respirable fine dust ● Allergens ● Mold spores ● Bacteria
6	**Basics of measurement methods**	VDI 2066, DIN EN 60312, DIN EN ISO 5167, ISO 12103-1, Allergen analysis: ELISA Test
7	**Devices used**	
7.1	**Particle counter**	Abakus ® mobil air (Fa. Klotz) ● Measuring range.....0,3 µm bis 10 µm ● Flow.....1 ft³/min (28,3 l/min) ● Max. Particle concentration: 10^6 Particle/CFM
7.2	**Germ collector**	Air sampler MAS-100 (Fa. Merck) with culture medium)
7.3	**Allergy collectors**	Allergen-air collector MBASS (Fa. Holbach)

8 Results oft he investigations

8.1 Separation measurements with room air dust

Boundary conditions:

- The indoor air dust concentration is approx. 20 µg/m³.
- The filter unit is operated with the nominal air volume flow of 300 m³/h.
- The values given are mean values from 2 measurements each.

Table 1: Separation performance against indoor air dust (with ionization unit Freshlight ionstar)

property	Fraction [µm]	Results [µm]
Degree of separation	0,3	99,02
Degree of separation	0,5	99,04
Degree of separation	0,7	98,22
Degree of separation	1,0	97,56
Degree of separation	1,5	96,86
Degree of separation	2,0	96,13
Degree of separation	2,5	95,99
Degree of separation	3,0	95,97
Degree of separation	3,5	96,30
Degree of separation	4,0	97,11
Degree of separation	5,0	98,31
Degree of separation	6,0	99,24
Degree of separation	7,0	99,19
Degree of separation	8,0	100,00
Degree of separation	9,0	100,00
Degree of separation	10,0	100,00
Total degree of separation	**0,3 to 10,0**	**98,54**
Degree of separation of respirable fine dust	**0,3 to 7,0**	**97,59**

8.2 Separation measurements with test dust A2 fine

Boundary conditions:

- Dust application in 2 steps with 1g/h each, 3 measurements per loading step.
- The filter unit is operated with the nominal air volume flow of 300 m³/h.
- The values given are mean values from 2 measurements each.

Table 2: Separation performance against test dus A2 fine (with Ionisationunit Freshlight Ionstar)

Measure ment	Separation of total dust	Separation of respirable fine dust
Step 1	99,98 %	99,96 %
Step 2	99,98 %	99,94 %

8.3 Mite allergen emissions when loaded with processed house dust

Boundary conditions:

- The processed house dust consists of particles ≤ 100 µm.
- The mite allergen content is1 *) 40 µg/g.
  *) Der p1: Major Allergen of the mite Dermatophagoides pteronyssinus
- Dust is applied in two steps, each with1 g/h.
- The filter unit is operated with the nominal air volume flow of 300 m³/h.
- The values given are mean values from 3 measurements.

Table 3: Clean air allergen content

Measurement	Clean air allergen content
Step 1	1,1 ng/m³
Step 2	1,0 ng/m³

8.4 Separation measurement with processed house dust against mold spores

Boundary conditions:

- The processed house dust consist of particles ≤ 100 µm.
- Mold spore content: ca. 50.000 KBE/g (KBE: Kolonien bildende Einheiten).
- Dust is applied in two steps, each with 1 g/h.
- The filter unit is operated with the nominal air volume flow of 300 m³/h.
- The values given are mean values from 3 measurements.
- The number of mold spores is determined after growing on nutrient media.

Table 4: Separation performance against mold spores

Measurement	Separation performance
Step 1	97 %
Step 2	97 %

8.5 Separation measurement with processed house dust against bacteria

Boundary conditions:

- The processed house dust consists of particles ≤ 100 µm.
- Bacteria content: ca. 80.000 KBE/g (KBE: Kolonien bildende Einheiten).
- Loading takes place in 2 steps, each with 1 g/h House dust.
- The filter unit is operated with the nominal air volume flow of 300 m³/h.
- The values given are mean values from 3 measurements.
- The number of bacteria is determined after cultivation on nutrient media

Table 5: Separation perfomance against bacteria

Measurements	Separation performance
Step 1	98 %
Step 2	98 %

9 Evaluation of the results

The values determined for the cleaning performance against fine dust, mite allergens, mold and bacteria have shown that the Brink KWL filter unit/ Freshlight Ionstar with a nominal air volume flow of 300 m³ / h as a component of a system for controlled living space ventilation (KWL) is able to To supply apartments with high-purity supply air.

Essen, 24.04.2020
DMT GmbH & Co. KG

(Selck) (Schäfer)