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TÜV®

TEST REPORT

No. SEGB-2540/08 of 11.12.2008

INDOOR AIR HYGIENE TEST OF AN INDOOR AIR PURIFIER AND HUMIDIFIER REGARDING SUITABILITY FOR ALLERGIC PEOPLE

I	**Customer**	Daikin Europe N. V., Oostende (Belgium)
II	**Test Product**	Indoor air purifier and humidifier Trade name of the product: **Ururu Air Purifier MCK75J**
III	**Purpose of Tests**	• Determination of indoor air cleaning performance of the unit for dust, mould spores, bacteria and allergens • Ascertainment of the ozone emission rate
IV	**Test Equipment**	• Testing room 40 m³ • Testing methods / measuring instruments: VDI 2066, VDI 2265, VDI 3489, DIN EN 481, DIN EN 779, DIN EN 1822, DIN ISO 7708, DIN EN ISO 5167, TRGS 402 and 403, RAL-ZU 114 • Germ analysis: microscopy • Allergen analysis: ELISA-Test
V	**Test Period (basic tests)**	July to November 2008

VI Test Results

VI.1 Air flow rates, electric power consumption and sound power levels

Parameter		Power setting				
		Quiet	Low	Standard	High	Turbo
Air flow rate at c. m.	[m³/h]	67	142	228	313	436
Electric power input at c. m.	[W]	7.5	10.9	17.8	31.6	82.2
Electric power input at h. m.	[W]	12.0	13.5	20.3	33.1	84.9
Sound power level at h. m.	[dB(A)]	36.1	39.7	50.9	57.7	65.4
Sound pressure level at h. m.	[dB(A)]	23.5	27.1	38.3	45.1	52.8

c. m.: cleaning mode
h. m.: humidifying mode

VI.2 Retention efficiencies regarding indoor air dust at "High" power setting

- Retention efficiency at 0.3 µm ..... 53.110 %
- Retention efficiency at 0.5 µm ..... 59.436 %
- Retention efficiency at 0.7 µm ..... 66.515 %
- Retention efficiency at 1.0µm ..... 73.675 %
- Retention efficiency at 1.5 µm ..... 73.101 %
- Retention efficiency at 2.0 µm ..... 87.687 %
- Retention efficiency at 2.5 µm ..... 91.068 %
- Retention efficiency at 3.0 µm ..... 93.679 %
- Retention efficiency at 3.5 µm ..... 93.303 %
- Retention efficiency at 4.0 µm ..... 93.342 %
- Retention efficiency at 5.0 µm ..... 94.101 %
- Retention efficiency at 6.0 µm ..... 92.934 %
- Retention efficiency at 7.0 µm ..... 94.324 %
- Retention efficiency at 8.0 µm ..... 93.338 %
- Retention efficiency at 9.0 µm ..... 93.900 %
- Retention efficiency at 10.0 µm ..... 97.111 %
- Total retention efficiency at 0.3 µm to 7 µm (respirable dust fraction) ..... 90.895 %
- Total retention efficiency at 0.3 µm to 10 µm ..... 95.179 %

VI.3 Retention efficiencies of test dust A2 acc. to ISO 12103-1 at "Standard" power setting

- **1st loading stage (dust feeding: 1 g/h)**
  - Mean retention efficiency for particles from 0.3 µm to 7 µm ..... 97.78 %
  - Mean retention efficiency for particles from 0.3 µm to 10 µm ..... 98.06 %
- **2nd loading stage (dust feeding: 1 g/h)**
  - Mean retention efficiency for particles from 0.3 µm to 7 µm ..... 97.24 %
  - Mean retention efficiency for particles from 0.3 µm to 10 µm ..... 98.03 %

VI.4 Retention of bacteria and mite allergens from house dust at "Standard" power setting

- **1st loading stage (dust feeding: 1 g/h)**
  - Mean retention efficiency for bacteria ..... 99.1 %
  - Emission of mite allergens ..... ≤ 1 ng/m³
- **2nd loading stage (dust feeding: 1 g/h)**
  - Mean retention efficiency for bacteria ..... 99.1 %
  - Emission of mite allergens ..... ≤ 1 ng/m³

VI.5 Retention efficiency regarding spores from pure mould cultures at "Standard" power setting

Mean retention efficiency for Penicillium and Cladosporium spores ..... 87.9 %

VI.6 Retention efficiencies regarding indoor air dust and mould spores in a long-term test at "Standard" power setting

- **Retention efficiencies at the start of the test**
  - Retention efficiency for particles from 0.3 µm to 7 µm ..... 90.1 %
  - Retention efficiency for particles from 0.3 µm to 10 µm ..... 96.0 %
  - Retention efficiency for mould spores ..... 91.1 %
- **Retention efficiencies after an operation time of 3 weeks**
  - Retention efficiency for particles from 0.3 µm to 7 µm ..... 93.7 %
  - Retention efficiency for particles from 0.3 µm to 10 µm ..... 96.7 %
  - Retention efficiency for mould spores ..... 97.5 %
- **Retention efficiencies after an operation time of 6 weeks**
  - Retention efficiency for particles from 0.3 µm to 7 µm ..... 93.2 %
  - Retention efficiency for particles from 0.3 µm to 10 µm ..... 98.3 %
  - Retention efficiency for mould spores ..... 77.1 %
- **Retention efficiencies after an operation time of 9 weeks**
  - Retention efficiency for particles from 0.3 µm to 7 µm ..... 92.0 %
  - Retention efficiency for particles from 0.3 µm to 10 µm ..... 95.6 %
  - Retention efficiency for mould spores ..... 88.6 %
- **Retention efficiencies after an operation time of 12 weeks**
  - Retention efficiency for particles from 0.3 µm to 7 µm ..... 91.0 %
  - Retention efficiency for particles from 0.3 µm to 10 µm ..... 95.1 %
  - Retention efficiency for mould spores ..... 80.0 %
- **Mean Retention efficiencies during the whole operation time**
  - Mean retention efficiency for particles from 0.3 µm to 7 µm ..... 92.0 %
  - Mean retention efficiency for particles from 0.3 µm to 10 µm ..... 96.9 %
  - Mean retention efficiency for mould spores ..... 86.9 %

VI.7 Germ colonisation on the clean air side at the end of the 12 weeks long-term test

After the 12 weeks long-term operation no germs were found at the air outlet of the unit.

VI.8 Bacteria and mould spores emission at continuous humidifier operation

• At the start of the test	Mould spores:	64 cfu;°	Bacteria:	8 cfu
• After 1 week	Mould spores:	70 cfu;	Bacteria:	20 cfu
• After 2 weeks	Mould spores:	24 cfu;°	Bacteria:	6 cfu
• After 3 weeks	Mould spores:	2 cfu;	Bacteria:	10 cfu
• After 4 weeks	Mould spores:	108 cfu;	Bacteria:	8 cfu
• After 5 weeks	Mould spores:	4 cfu;	Bacteria:	4 cfu
• After 6 weeks	Mould spores:	32 cfu;	Bacteria:	2 cfu
• After 7 weeks	Mould spores:	34 cfu;	Bacteria:	4 cfu
• After 8 weeks	Mould spores:	20 cfu;	Bacteria:	2 cfu
• After 9 weeks	Mould spores:	8 cfu;	Bacteria:	2 cfu
• After 10 weeks	Mould spores:	42 cfu;	Bacteria:	8 cfu
• After 11 weeks	Mould spores:	2 cfu;	Bacteria:	0 cfu
• After 12 weeks	Mould spores:	6 cfu;	Bacteria:	6 cfu

VI.9 Growing of bacteria in the water tray at continuous humidifier operation

- At the start of the test ..... < 500 cfu
- After 1 day ..... < 500 cfu
- After 2 days ..... < 500 cfu
- After 3 days ..... 500 – 1,000 cfu
- After 4 days ..... 500 – 1,000 cfu
- After 5 days ..... >10,000 cfu
- After 6 days ..... > 10,000 cfu
- After 7 days ..... > 10,000 cfu

VI.10 Measurement of the ozone emission

The ozone emission of the unit in a test room of 42 m³ was determined as 2.6 µg/m³.

VII Evaluation of the test results

The TÜV NORD test mark **"Indoor Air Hygiene Test – Suitable for Allergic People"** is only granted for use, if an indoor air purifier and humidifier fulfils the following criteria:

- Deviation from specified ventilation and electrical data ..... ≤ 5 %
- Deviation from specified sound power levels ..... ≤ 2 dB
- Total retention efficiency for indoor air dust particles from 0.3 µm to 7 µm ..... ≥ 90 %
- Total retention efficiency for indoor air dust particles from 0.3 µm to 10 µm ..... ≥ 95 %
- Total retention efficiency for test dust A2 particles from 0.3 µm to 7 µm ..... ≥ 96 %
- Total retention efficiency for test dust A2 particles from 0.3 µm to 10 µm ..... ≥ 98 %
- Retention efficiency for mould spores ..... ≥ 85 %
- Retention efficiency for bacteria ..... ≥ 95 %
- Clean air allergen content in tests with prepared house dust ..... < 1 ng/m³
- Germ colonisation on the clean air side of the unit after 12 weeks operation ... none
- Rise of bacteria emission in a 12 weeks continuous operation ..... none
- Limitation of bacteria growth in the humidifying water ..... ensured by cleaning
- Ozone emission ..... < 15 µg/m³

The Daikin air purifier and humidifier **MCK75J** meets these requirements as documented in section VI of the present test report.

On the basis of these test results, Daikin Europe N. V., Oostende (Belgium), was granted permission by TÜV NORD, Hamburg (Germany), to use the TÜV NORD test mark "Indoor Air Hygiene Test – Suitable for Allergic People" for the air purifier and humidifier MCK75J.

VIII Conditions for the use of the TÜV NORD test mark

VIII.1 Daikin Europe N. V., Oostende (Belgium), is hereby granted permission to use the TÜV NORD test mark **"Indoor Air Hygiene Test – Suitable for Allergic People"**. This approval applies exclusively to the model of the air purifier and humidifier MCK775J, which was tested.
The permission to use this test mark also applies to Daikin's affiliates, distributors, authorized dealers and authorized sales companies.

VIII.2 The product which was tested is documented by the test specimen deposited with the test institute.

VIII.3 Maintenance of the level of technology and the retention characteristics of the product will be checked by TÜV NORD in a periodic inspection conducted at least once a year.

VIII.4 TÜV NORD will take the test specimen for the periodic inspection from production or from stock without prior notice.

VIII.5 To maintain the approval for use of the TÜV NORD test mark **"Indoor Air Hygiene Test – Suitable for Allergic People"** the periodic inspections must be completed with positive results.

TÜV NORD Systems GmbH & Co. KG
Testing Laboratory for Indoor Air Hygiene

Essen, 11 December 2008

Dipl.-Ing. R. Schüler