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Test Report

Tests on the DAIKIN Photocatalytic Air Purifier

MC704VM

Part II

Measurements of the retention efficiency on room air dust

1 Objective of the test

The objective of the test was to determine the performance of the unit at all power settings with regard to the retention of room air dust.

2 Performance and results of the test

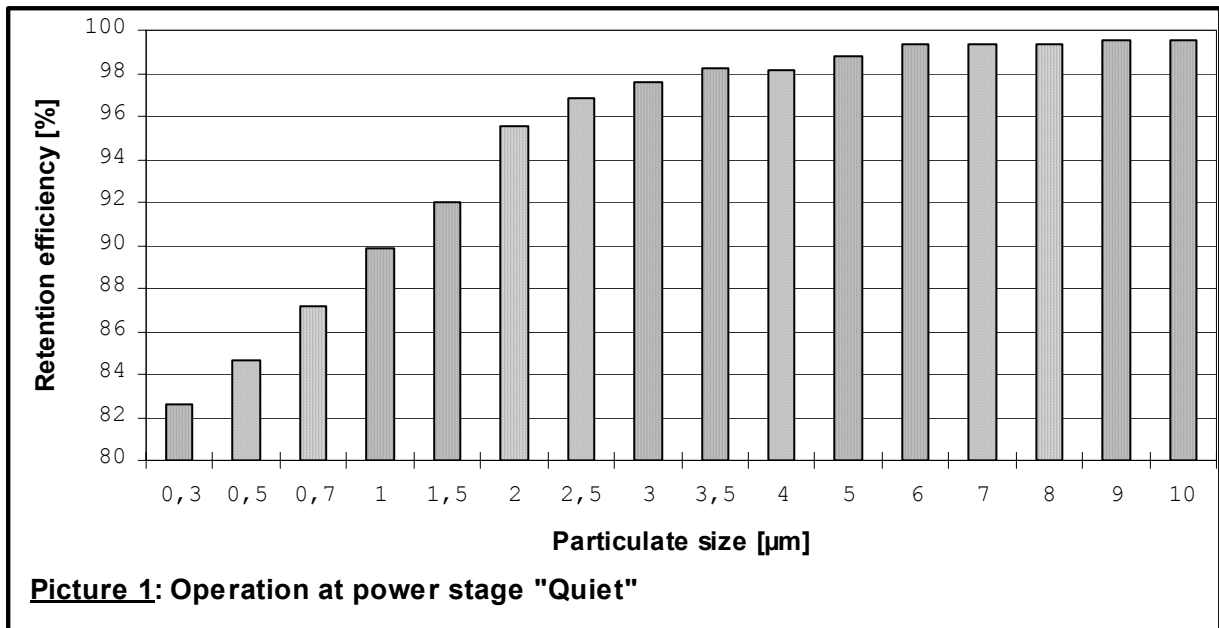
The measurements for this test were performed in a duct, see the following photography:



The room air purifier was installed at the end of the duct (dimensions: 650 x 650 x 2000 mm) through which the room air was sucked in. The particulate concentration of the room air was measured in this duct.

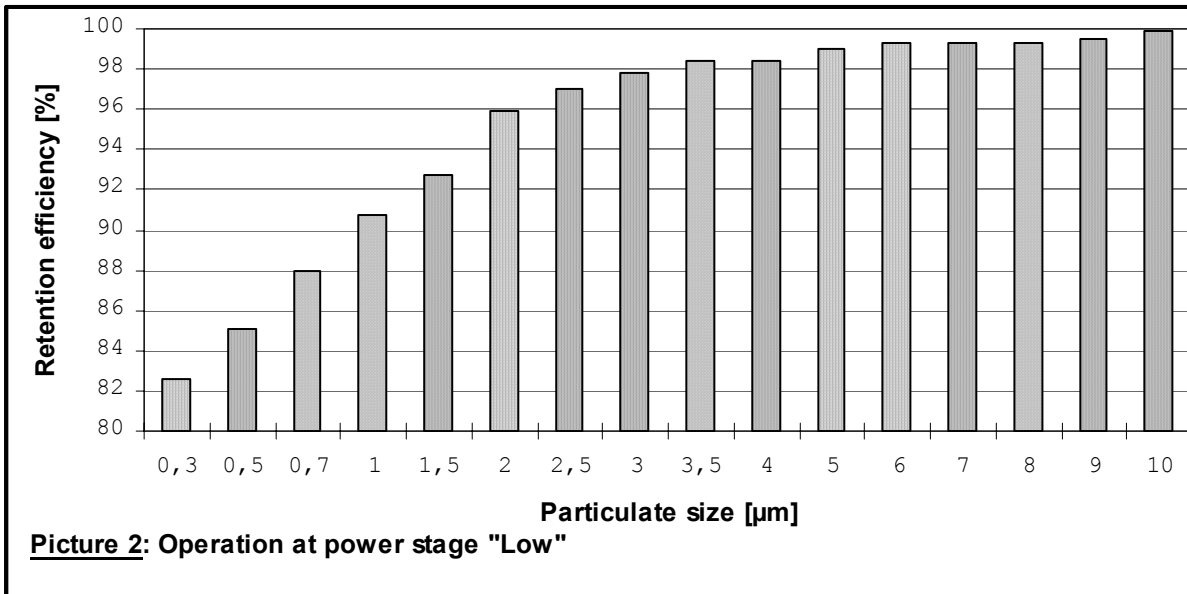
The following photography shows the duct (dimensions: 100 x 190 x 1000 mm) which was connected to the air outlet of the test unit. This duct was used to measure the particulate concentration of the clean air.





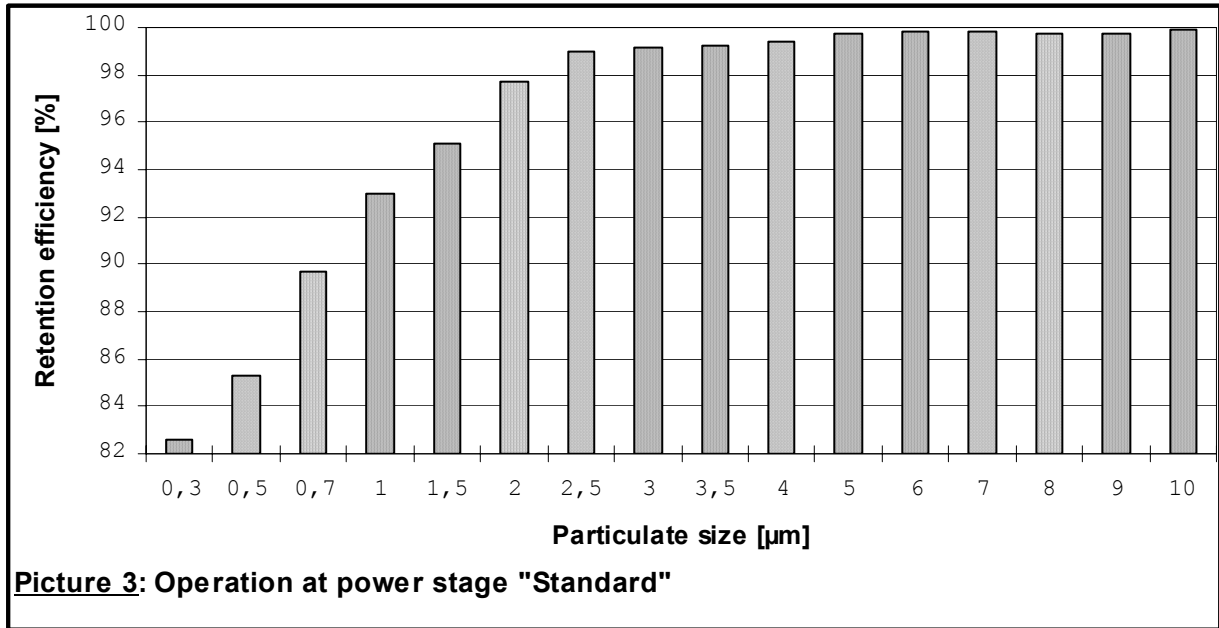
| Manufacturer/Model | | Daikin/MC704VM | | | | |
|-------------------------|---------------|---------------------------------------|----------------------|---------------|-------------|--------------------|
| Designation of the test | | Retention efficiency of room air dust | | | | |
| Measurement | | Operation at power stage "Quiet" | | | | |
| Inlet concentration | | | Outlet concentration | | Efficiency | |
| Size [µm] | Particles/min | Density | Mass [µg] | Particles/min | Mass [µg] | [%] |
| 0,3 | 63655 | 1 | 0,000899445 | 11091 | 0,000156716 | 82,57638834 |
| 0,5 | 86378 | 1 | 0,005650561 | 13280 | 0,000868733 | 84,62571488 |
| 0,7 | 43878 | 1 | 0,007876247 | 5645 | 0,001013296 | 87,13478281 |
| 1 | 15590 | 1 | 0,008158767 | 1583 | 0,000828437 | 89,84605516 |
| 1,5 | 12456 | 1 | 0,02200041 | 1002 | 0,001769783 | 91,95568401 |
| 2 | 3779 | 1 | 0,015821413 | 169 | 0,000707547 | 95,52791744 |
| 2,5 | 850 | 1 | 0,006950521 | 27 | 0,000220781 | 96,82352941 |
| 3 | 622 | 1 | 0,00878886 | 15 | 0,00021195 | 97,58842444 |
| 3,5 | 333 | 1 | 0,007471826 | 6 | 0,000134628 | 98,1981982 |
| 4 | 380 | 1 | 0,012727467 | 7 | 0,000234453 | 98,15789474 |
| 5 | 400 | 1 | 0,026166667 | 5 | 0,000327083 | 98,75 |
| 6 | 312 | 1 | 0,03526848 | 2 | 0,00022608 | 99,35897436 |
| 7 | 315 | 1 | 0,05654355 | 2 | 0,000359007 | 99,36507937 |
| 8 | 318 | 1 | 0,08520704 | 2 | 0,000535893 | 99,37106918 |
| 9 | 219 | 1 | 0,08355069 | 1 | 0,00038151 | 99,543379 |
| 10 | 230 | 1 | 0,120366667 | 1 | 0,000523333 | 99,56521739 |
| Total | | | 0,50344861 | | | 0,00849923 |
| C [mg/m³] | | | 0,017789704 | | | 0,000300326 |
| C [µg/m³] | | | 17,790 | | | 0,30 |
| Efficiency [%] | | | 98,31179789 | | | |

Table 1: Measuring values to picture 1



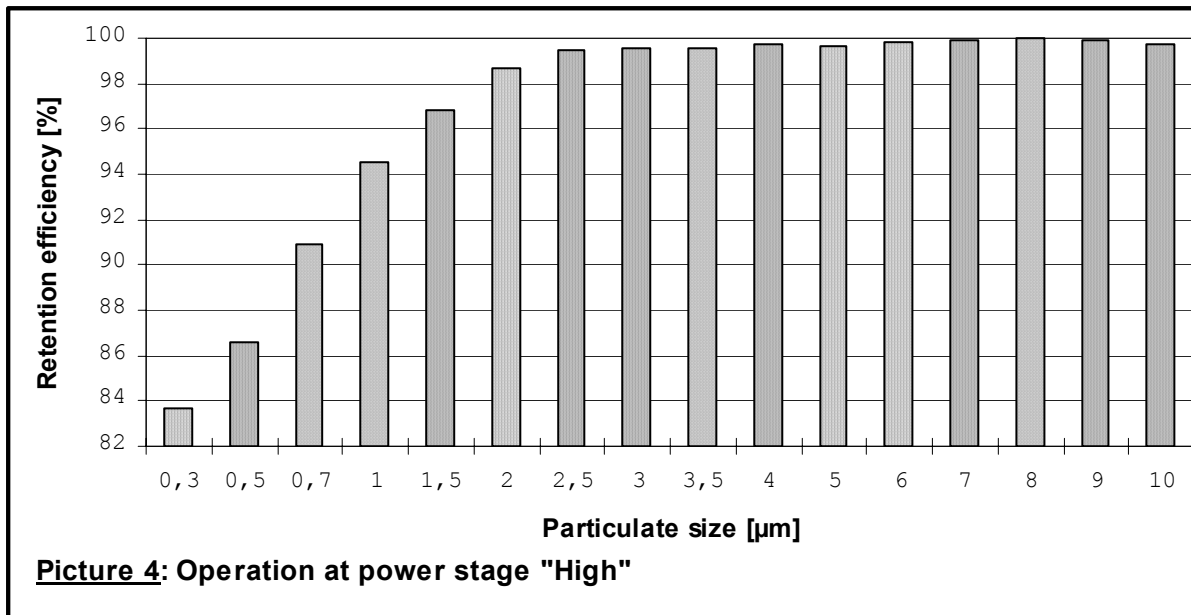
| Manufacturer/Model | | Daikin/MC704VM | | | | | |
|-------------------------|---------------|---------------------------------------|--------------------|----------------------|-------------|--------------------|--|
| Designation of the test | | Retention efficiency of room air dust | | | | | |
| Measurement | | Operation at power stage "Low" | | | | | |
| Inlet concentration | | | | Outlet concentration | | Efficiency | |
| Size [µm] | Particles/min | Density | Mass [µg] | Particles/min | Mass [µg] | [%] | |
| 0,3 | 63724 | 1 | 0,00090042 | 11091 | 0,000156716 | 82,59525454 | |
| 0,5 | 88840 | 1 | 0,005811617 | 13280 | 0,000868733 | 85,05177848 | |
| 0,7 | 46903 | 1 | 0,008419245 | 5645 | 0,001013296 | 87,96452253 | |
| 1 | 17128 | 1 | 0,008963653 | 1583 | 0,000828437 | 90,75782345 | |
| 1,5 | 13748 | 1 | 0,024282405 | 1002 | 0,001769783 | 92,71166715 | |
| 2 | 4099 | 1 | 0,017161147 | 169 | 0,000707547 | 95,87704318 | |
| 2,5 | 919 | 1 | 0,00751474 | 27 | 0,000220781 | 97,06202394 | |
| 3 | 677 | 1 | 0,00956601 | 15 | 0,00021195 | 97,78434269 | |
| 3,5 | 369 | 1 | 0,008279591 | 6 | 0,000134628 | 98,37398374 | |
| 4 | 450 | 1 | 0,015072 | 7 | 0,000234453 | 98,44444444 | |
| 5 | 520 | 1 | 0,034016667 | 5 | 0,000327083 | 99,03846154 | |
| 6 | 280 | 1 | 0,0316512 | 2 | 0,00022608 | 99,28571429 | |
| 7 | 290 | 1 | 0,052055967 | 2 | 0,000359007 | 99,31034483 | |
| 8 | 295 | 1 | 0,079044267 | 2 | 0,000535893 | 99,3220339 | |
| 9 | 192 | 1 | 0,07324992 | 1 | 0,00038151 | 99,47916667 | |
| 10 | 701 | 1 | 0,366856667 | 1 | 0,000523333 | 99,85734665 | |
| Total | | | 0,742845514 | | | 0,00849923 | |
| C [mg/m³] | | | 0,026248958 | | | 0,000300326 | |
| C [µg/m³] | | | 26,249 | | | 0,30 | |
| Efficiency [%] | | | 98,85585497 | | | | |

Table 2: Measuring values to picture 2



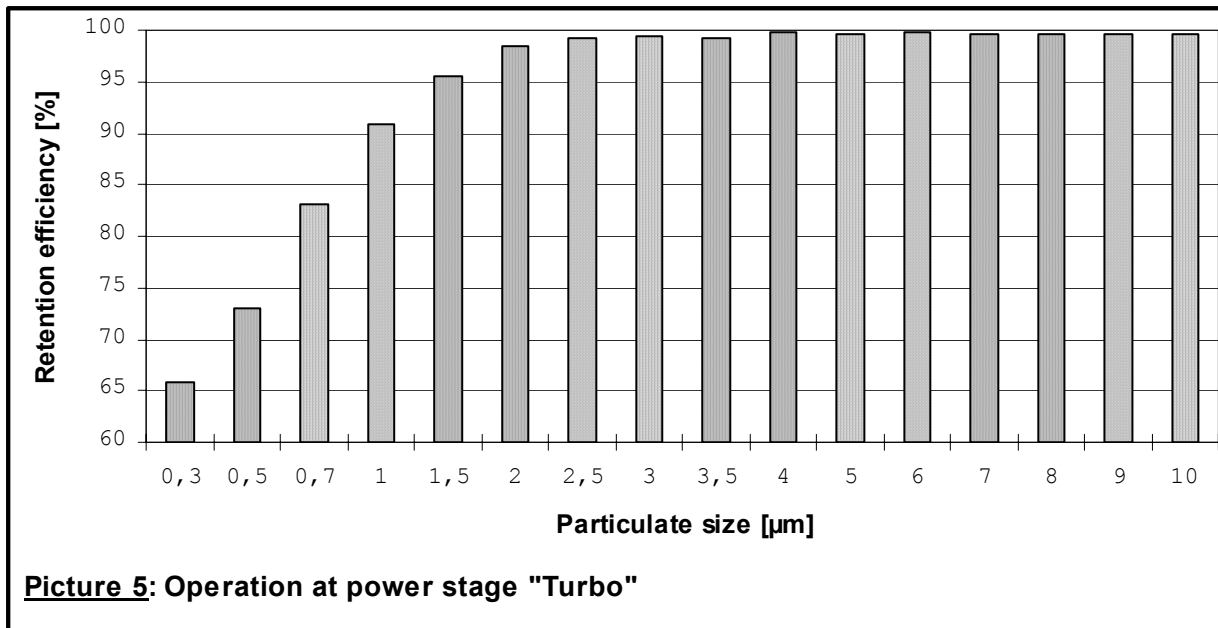
| Manufacturer/Model | | Daikin/MC704VM | | | | | |
|-------------------------|---------------|---------------------------------------|--------------------|----------------------|-------------|-------------------|--|
| Designation of the test | | Retention efficiency of room air dust | | | | | |
| Measurement | | Operation at power stage "Standard" | | | | | |
| Inlet concentration | | | | Outlet concentration | | Efficiency | |
| Size [µm] | Particles/min | Density | Mass [µg] | Particles/min | Mass [µg] | [%] | |
| 0,3 | 70343 | 1 | 0,000993947 | 12259 | 0,00017322 | 82,57253742 | |
| 0,5 | 99932 | 1 | 0,006537218 | 14733 | 0,000963784 | 85,25697474 | |
| 0,7 | 57409 | 1 | 0,010305107 | 5908 | 0,001060506 | 89,70893066 | |
| 1 | 22986 | 1 | 0,01202934 | 1607 | 0,000840997 | 93,00878796 | |
| 1,5 | 20088 | 1 | 0,03548043 | 991 | 0,001750354 | 95,06670649 | |
| 2 | 6758 | 1 | 0,028293493 | 152 | 0,000636373 | 97,75081385 | |
| 2,5 | 1647 | 1 | 0,013467656 | 17 | 0,00013901 | 98,96782028 | |
| 3 | 1303 | 1 | 0,01841139 | 11 | 0,00015543 | 99,15579432 | |
| 3,5 | 684 | 1 | 0,015347535 | 5 | 0,00011219 | 99,26900585 | |
| 4 | 809 | 1 | 0,027096107 | 5 | 0,000167467 | 99,38195303 | |
| 5 | 1124 | 1 | 0,073528333 | 3 | 0,00019625 | 99,73309609 | |
| 6 | 751 | 1 | 0,08489304 | 1 | 0,00011304 | 99,86684421 | |
| 7 | 594 | 1 | 0,10662498 | 1 | 0,000179503 | 99,83164983 | |
| 8 | 415 | 1 | 0,111197867 | 1 | 0,000267947 | 99,75903614 | |
| 9 | 411 | 1 | 0,15680061 | 1 | 0,00038151 | 99,756691 | |
| 10 | 830 | 1 | 0,434366667 | 1 | 0,000523333 | 99,87951807 | |
| Total | | | 1,13537372 | | | 0,007660913 | |
| C [mg/m³] | | | 0,040119213 | | | 0,00027074 | |
| C [µg/m³] | | | 40,119 | | | 0,27 | |
| Efficiency [%] | | | 99,32525188 | | | | |

Table 3: Measuring values to picture 3



| Manufacturer/Model | | Daikin/MC704VM | | | | |
|-------------------------|---------------|---------------------------------------|----------------------|---------------|-------------|-------------------|
| Designation of the test | | Retention efficiency of room air dust | | | | |
| Measurement | | Operation at power stage "High" | | | | |
| Inlet concentration | | | Outlet concentration | | Efficiency | |
| Size [µm] | Particles/min | Density | Mass [µg] | Particles/min | Mass [µg] | [%] |
| 0,3 | 91594 | 1 | 0,001294223 | 14926 | 0,000210904 | 83,70417276 |
| 0,5 | 135192 | 1 | 0,00884381 | 18102 | 0,001184173 | 86,61015445 |
| 0,7 | 78958 | 1 | 0,014173224 | 7146 | 0,001282731 | 90,94961878 |
| 1 | 33833 | 1 | 0,017705937 | 1862 | 0,000974447 | 94,4964975 |
| 1,5 | 31598 | 1 | 0,055809968 | 1014 | 0,001790978 | 96,79093614 |
| 2 | 11298 | 1 | 0,04730096 | 146 | 0,000611253 | 98,70773588 |
| 2,5 | 2889 | 1 | 0,023623594 | 15 | 0,000122656 | 99,4807892 |
| 3 | 2300 | 1 | 0,032499 | 10 | 0,0001413 | 99,56521739 |
| 3,5 | 1246 | 1 | 0,027957644 | 6 | 0,000134628 | 99,51845907 |
| 4 | 1464 | 1 | 0,04903424 | 4 | 0,000133973 | 99,72677596 |
| 5 | 2068 | 1 | 0,135281667 | 7 | 0,000457917 | 99,6615087 |
| 6 | 1445 | 1 | 0,1633428 | 3 | 0,00033912 | 99,79238754 |
| 7 | 1182 | 1 | 0,21217294 | 1 | 0,000179503 | 99,91539763 |
| 8 | 799 | 1 | 0,214089387 | 0 | 0 | 100 |
| 9 | 824 | 1 | 0,31436424 | 1 | 0,00038151 | 99,87864078 |
| 10 | 845 | 1 | 0,442216667 | 2 | 0,001046667 | 99,76331361 |
| Total | | | 1,759710299 | | | 0,008991759 |
| C [mg/m³] | | | 0,062180576 | | | 0,00031773 |
| C [µg/m³] | | | 62,181 | | | 0,32 |
| Efficiency [%] | | | 99,4890205 | | | |

Table 4: Measuring values to picture 4



| Manufacturer/Model | | Daikin/MC704VM | | | | |
|-------------------------|---------------|---------------------------------------|----------------------|---------------|-------------|--------------------|
| Designation of the test | | Retention efficiency of room air dust | | | | |
| Measurement | | Operation at power stage "Turbo" | | | | |
| Inlet concentration | | | Outlet concentration | | Efficiency | |
| Size [µm] | Particles/min | Density | Mass [µg] | Particles/min | Mass [µg] | [%] |
| 0,3 | 79732 | 1 | 0,001126613 | 27289 | 0,000385594 | 65,77409321 |
| 0,5 | 120173 | 1 | 0,007861317 | 32393 | 0,002119042 | 73,0446939 |
| 0,7 | 72448 | 1 | 0,013004657 | 12237 | 0,002196582 | 83,10926458 |
| 1 | 31823 | 1 | 0,016654037 | 2887 | 0,001510863 | 90,9279452 |
| 1,5 | 30541 | 1 | 0,053943041 | 1371 | 0,002421529 | 95,51095249 |
| 2 | 11220 | 1 | 0,0469744 | 185 | 0,000774533 | 98,35115865 |
| 2,5 | 2980 | 1 | 0,024367708 | 21 | 0,000171719 | 99,29530201 |
| 3 | 2380 | 1 | 0,0336294 | 14 | 0,00019782 | 99,41176471 |
| 3,5 | 1316 | 1 | 0,029528298 | 9 | 0,000201941 | 99,31610942 |
| 4 | 1433 | 1 | 0,047995947 | 4 | 0,000133973 | 99,72086532 |
| 5 | 2093 | 1 | 0,136917083 | 10 | 0,000654167 | 99,52221691 |
| 6 | 1525 | 1 | 0,172386 | 4 | 0,00045216 | 99,73770492 |
| 7 | 1167 | 1 | 0,20948039 | 4 | 0,000718013 | 99,65724079 |
| 8 | 903 | 1 | 0,24195584 | 3 | 0,00080384 | 99,66777409 |
| 9 | 884 | 1 | 0,33725484 | 3 | 0,00114453 | 99,66063348 |
| 10 | 739 | 1 | 0,386743333 | 3 | 0,00157 | 99,59404601 |
| Total | | | 1,759822906 | | | 0,015456307 |
| C [mg/m³] | | | 0,062184555 | | | 0,000546159 |
| C [µg/m³] | | | 62,185 | | | 0,55 |
| Efficiency [%] | | | 99,12171238 | | | |

Table 5: Measuring values to picture 5

The measuring data in the charts which were determined by an electronical particulate analyzer, represent average values from 3 measurements each.

3 Assessment of the results

The different retention efficiencies of the different power stages showed values between 98.3 % ("Quiet") and 99.5 % ("High"). These results can be rated as "good".

In order to answer the question whether or not the air purifier will probably meet the requirements set in the "Test and Assessment Criteria" (TAC) which RWTÜV has established for granting the TÜV test mark "Suitable for Allergy Sufferers", the overall retention efficiency for the particulates between 0.3 µm and 5 µm is of a certain importance. The evaluation of the measuring data for the power setting "High" delivers a retention value of 98.3 %. This value is in accordance with the corresponding limiting value (> 95 %) of the afore mentioned TAC.