

Certified performances for air cleaners

Air cleaning devices: a growing market polluted by confusing communication

According to an industry study published in March 2016 by the Freedonia Group¹, global demand for consumer air treatment systems is projected to increase to over \$10 billion in 2019.

Indeed, the growing public awareness about indoor air pollution coming from furniture, construction materials and sometimes poor quality ventilation has conducted the consumers to care more and more about the effect that these pollutants can have on their health. In some countries, such as Japan, where air cleaning systems are used to capture tobacco smoke when smoking indoor, the air cleaning devices have even become part of “standard” domestic appliances. Besides, the rising diagnosis of asthma and allergic rhinitis, as well as peak pollution incidents in urban areas are contributing to increase the air cleaning devices market demand. This phenomenon has become worldwide and air cleaning devices are appearing everywhere on the market.

In this growing market the manufacturers are all claiming that their product is “efficient against all air pollutants” and will “ensure a purified air in the house where children will be safer and parents happier”. Still, few manufacturers quantify their product performance and when they provide figures these are difficult to compare (different units, no information about operating conditions...). The consumer is therefore forced to base his choice on marketing criteria without any clear commitment from the manufacturer.

A need for a harmonized evaluation method

To enable and encourage manufacturers to communicate about quantified performances on a levelled ground, the first step is to provide them a standard to refer to. Indeed, there is no international product standard available for air cleaners except for electrical



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safety aspects². Several testing methods are coexisting (ANSI/AHAM AC-1:2006³, JEM 1467:2013⁴, GB/T 18801:2015⁵...) and used by some manufacturers to evaluate their products. However, these methods are not recognized on a global scale and the valorisation is limited to the local market.

Among these testing standards exist the NF-B44-200:2016⁶ and prEN 16846-1:2015⁷, respectively derived from experimental testing standards XP-B44-200:2011⁸ and XP-B44-013:2009⁹. These are candidates as testing standards on the international stage. The specificity of NF-B44-200:2016 is the consid-

- 2 IEC 60335-2-65:2002 Household and similar electrical appliances – Safety – Part 2-65: Particular requirements for air-cleaning appliances, International Electrotechnical Commission, 2002.
- 3 ANSI/AHAM AC-1:2006 Method for measuring performance of portable household electric room air cleaners, Association of Home Appliance Manufacturers, 2006.
- 4 JEM 1467:2013 Air Cleaners of Household and Similar Use, Japan Electrical Manufacturers' Association, 2013.
- 5 GB/T 18801:2015 Air Cleaner, Standardization Administration of the People's Republic of China, 2015.
- 6 NF-B44-200:2016 Independent air purification devices for tertiary sector and residential applications - Test methods - Intrinsic performances, AFNOR, 2016.
- 7 prEN 16846-1:2015: Photocatalysis - Batch mode test methods - Part 1: measurement of efficiency of photocatalytic devices used for the elimination of VOC and odour in indoor air in active mode, AFNOR, 2015.
- 8 XP-B44-200:2011 (OBSOLETE) Independent air purification devices for tertiary sector and residential applications-Test methods - Intrinsic performances, AFNOR, 2011.
- 9 XP-B44-013:2009 Photocatalysis -Test and analysis method for determining the efficiency of photocatalytic systems for eliminating volatile organic compounds/odours in recirculating interior air -Confined chamber test, AFNOR, 2009.

¹ World Consumer Air Treatment Systems, Industry study 3370, The Freedonia Group Inc., March 2016.

eration of 11 indoor air pollutants¹⁰ divided into 4 categories (Particulate Matters, Volatile Organic Compounds, Micro-organisms and Allergens). Besides, the NF-B44-200:2016 comprises a measurement of reaction intermediates (ozone, carbon monoxide, nitrogen monoxide, nitrogen dioxide) to verify that no dangerous products are emitted by the device.

The NF-Air Cleaners mark

Eurovent Certita Certification has developed a new NF mark certification for Air Cleaners under a mandate from AFNOR Certification. A dedicated working group gathered four times between May and November 2015 to establish the certification requirements and the draft document was approved by AFNOR Certification in January 2016. The NF-Air Cleaners certification scheme¹¹ entered into force on 2016, March 1st.

This NF mark aims at certifying models of air cleaning devices (i.e. device basically built of a fan and a set of components possessing the ability to capture and/or partially or totally destroy air pollutants⁶) for residential (domestic) and tertiary (stores, offices, classrooms, waiting rooms...) sector applications. This definition covers all types of technology: mechanical filtration, electrostatic filtration, plasma, ionization, UV-A or UV-C lamp, etc.

The Air Cleaners certification scheme enables to verify the accuracy of the performance ratings claimed by manufacturers in terms of effectiveness with respect to several pollutants¹⁰, but also regarding the power consumption and the sound power level of the device.

This verification is performed through product performance testing conducted by independent laboratories selected by Eurovent Certita Certification. As the testing standard NF-B44-200:2016 was chosen as product performance testing method reference, the test enables to verify not only the ratings but also that no dangerous products are emitted. Testing standard XP-B44-013:2009⁹ may be used as a supplement in some particular cases identified in the reference document¹¹.

The purification efficiency is tested at maximum operating speed for one or several pollutants category. It is understood that a manufacturer has to declare ratings

for all the pollutants that belong to the category. For example, if the manufacturer wants to claim that his product can remove formaldehyde from the air then he must declare ratings for the 4 remaining gases too¹⁰ and the air cleaner is tested for the whole gas mixture as foreseen in the testing standard⁶. Eurovent Certita Certification will proceed to careful examination of technical and sales documentation (paper and/or website content) to verify the consistency between the declaration and the communications to the public.

The air volume flow rate, the sound power level and the electrical power consumption are tested at the maximum operating speed but also at minimum and intermediate speeds whenever applicable¹¹. This enables the end-user to verify the device sound power level at low speed operation ("night mode" for example).

The testing requirements do not stop there. To pass the test, there shall be no generation of reaction/emission by-products and the sound power level at maximum speed shall not exceed 60 dB[A] (when maximum purified air flow rate $\leq 250 \text{ m}^3/\text{h}$; 65 dB[A] otherwise¹¹).

In addition to product performance testing, the certification scheme comprises factory audits to check that the quality management system in place ensures the manufacturing process reliability and consistency. This guarantees that the tested products, sampled from the manufacturing facility or directly from the market, are representative of the whole production.

If the manufacturer has passed the tests and audits and that he complies with the specified requirements in terms of clarity and transparency of published ratings, then he is granted the right to use the NF-Air Cleaners labelling on the certified air cleaner model(s) and the documentation for a given period mentioned on the certification diploma. Once an air cleaner model is certified, a surveillance procedure is initiated, comprising annual product performance testing and annual factory audits to verify that the requirements continue to be fulfilled throughout the years. This surveillance procedure is mandatory to renew the authorization to use the NF-Air Cleaners labelling.



AIR CLEANERS

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**NF-Air Cleaners
certification mark labelling**

¹⁰ Particulate matter (PM) in the 0.3 μm to 0.5 μm size range, PM in the 1.0 μm to 2.0 μm size range, PM in the 3.0 μm to 5.0 μm size range, Acetone, Acetaldehyde, Heptane, Toluene, Formaldehyde, Staphylococcus epidermidis (bacteria), Aspergillus Niger (fungi) and Fel D1 (cat allergen).

¹¹ NF-536 Certification rules for NF-Air Cleaners, Eurovent Certita Certification, 2016.

No room for ambiguity in the NF-Air Cleaners mark

The NF-Air Cleaners mark aims at guaranteeing clarity, transparency and comparability of the information related to the product use. Thus, to avoid any ambiguity in relation to the room size where the device use can be recommended, the NF-Air Cleaners reference document¹¹ establishes a consistency principle between the purified air volume flow rate delivered by the device and the surface area of the room through a minimum ratio criteria. For further details about this consistency principle please refer to the reference document¹¹ which is available on-line¹².

For example, when a manufacturer claims that the air cleaner can be used to remove VOCs in a room of 50 m², the related purified air volume flow rate measured by the laboratory shall be higher than or equal to 250 m³/h. If this is not the case, the manufacturer shall no longer communicate about 50 m² and update his documentation with the surface area that corresponds to the measured purified air volume flow rate and complies with the minimum ratio defined in the NF-Air Cleaners reference document¹¹.

Another measure to eliminate any risk of misunderstanding consists in specifying clearly in which measure units the manufacturer has to communicate data. For instance sound pressure levels shall be replaced by sound power levels and the values shall be displayed in dB[A]. Besides whenever the manufacturer displays a performance value the corresponding operation speed must appear.

Foreseen evolutions of the NF-Air Cleaners mark

In the near future, the NF-Air Cleaners mark will most certainly evolve to cover industrial applications and duct mounted installations. A dedicated committee gathering manufacturers, laboratories as well as consumers' associations is in charge of these future developments which will be managed by Eurovent Certita Certification.

As a matter of fact, the first update of the reference document is being reviewed by the NF-Air Cleaners mark committee. This revision aims notably at implementing the minor changes in the testing standard. Indeed, the NF-B44-200:2016⁶, which replaces the XP-B44-200:2011⁸ standard referred to in the original NF-Air Cleaners document¹¹, changes the

composition of the tested mixture of gaseous pollutants with the introduction of formaldehyde and the decrease of the gases concentration towards more realistic values. The proposal of revision also provides some clarifications regarding product sampling rules and tests to be conducted in the surveillance procedure.

The revision of the reference document is expected to be published in February 2017.

A European certification scheme

As for the Euro-HP certification scheme, which enables participants to the NF-Heat pumps mark to be eligible to the Eurovent Certified Performance (ECP) mark (see dedicated article in REHVA Journal of March 2016¹³), it is foreseen to offer a European-Air Cleaners (Euro-ACL) mark for companies participating to the NF-Air Cleaners scheme.

This ECP certification will rely upon the completion of the NF-Air Cleaners process and the verification that the general requirements of the ECP mark, as detailed in related Certification Manual¹⁴, are fulfilled.

The manufacturer will therefore be able to benefit from the ECP mark notoriety while capitalizing on existing efforts.

The draft documents will be submitted for approval to the Certification Programmes and Policy Commission, independent body in charge of guaranteeing the consistency between ECP programmes. The Euro-ACL mark is expected to enter into force in March 2017.

How to get further information?

Anyone willing to get further information about the NF-Air Cleaners certification can visit the dedicated webpage where the applicable reference document is available in English¹².

For specific questions or to apply for the certification scheme please contact apply@eurovent-certification.com specifying "NF-Air Cleaners" in the e-mail object. There is no deadline as this is a voluntary registration. ■

¹² <http://www.certita.fr/en/certita-mark/nf-air-cleaners>.

¹³ New challenges for heat pump Certification, Eurovent Certita Certification, REHVA Journal Volume 53 p.31-35, March 2016.

¹⁴ Certification Manual of the Eurovent Certified Performance Mark 13th edition, Eurovent Certita Certification, November 2016.