The photocatalytic air purifier with the No. 1 infectious disease control effect is APS Japan's photocatalytic sterilization deodorizer "ARC".

Rating Japan awarded "Data Premium Rating / No.1 Certification"

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General Incorporated Foundation Rating Japan Research Organization

The photocatalytic air purifier with the No. 1 infectious disease control effect is APS Japan Co. Ltd.’s photocatalytic sterilization deodorizer "ARC"~ Awarded Data Premium Rating No.1

Certification ~

This time, the General Incorporated Foundation Japan Research Organization (Representative Director: Hajime Hasunuma, Chiyoda-ku, Tokyo) is a photocatalytic disinfectant deodorizer "arc" of APS Japan Co., Ltd. (President: Teruo Watanabe, Headquarters: Chuo-ku, Osaka). Was evaluated as a photocatalytic air purifier with the best anti-infectious disease control effect and was awarded the "Data Premium Rating / No. 1 Certification".
This certification is one of the categories of the certification system by the Foundation, and it is a product recognized as having the No. 1 performance by conducting a test analysis with a certain evaluation standard by comparing similar products in the same price range. It is a proof of.

Air purifiers, which have undergone innovative evolution in recent years, are now attracting great expectations not only for their basic functions of dust collection and deodorization, but also for their effectiveness in combating infectious diseases caused by viruses and bacteria.
However, in order to prevent infection with the new coronavirus, "ventilation" that discharges pathogens floating in the air, such as opening windows, is said to be effective, but the use of mobile air purifiers is generally used. The Ministry of Health, Labor and Welfare has stated that "it cannot be uniformly recommended for its use" from the viewpoint of infection prevention because the air volume is small and the performance of the installed filters varies. About ventilation to improve "closed space with poor ventilation" in facilities, etc. "March 2020 data).

Therefore, in order to clarify the mobile air purifier that is most expected to be effective against infectious diseases, the foundation has adopted a "photocatalytic air purifier" that applies the "photocatalyst", which is the most advanced deodorizing and sterilizing technology. I paid attention to it. "Photocatalyst" is a substance that oxidizes and reduces its surface by irradiating it with light, and titanium oxide (TiO2) is famous. Since this oxidation / reduction action exerts various effects such as deodorization, antibacterial, antifungal, antiviral, and self-cleaning, it is being used as an interior / exterior material for buildings.

The Foundation first picked up seven typical photocatalytic air purifiers on the market and conducted a test to measure the decomposition capacity of "acetaldehyde" in order to compare the deodorizing performance of each model.
Furthermore, for models with the best decomposition ability, the odor components "n-yoshigusaic acid (smell like sweat, stuffy body odor and socks)", "ammonia (smell of urine and toilet)" and "trimethylamine" (Fish rotten odor)" is judged by four odor judges (sensitivity test).

Next, in order to investigate the sterilization performance, we compared the reduction performance against "lactic acid bacteria" (Lactobacillus plantarum AN3-2 strain), which

is more difficult to decompose than viruses, with another two models that adopt a technology different from photocatalyst. bottom.

From the above test results, it became clear that the photocatalytic sterilization deodorizer **"ARC" of APS Japan Co., Ltd.** is a photocatalytic air purifier with deodorizing and sterilizing performance suitable for **"No. 1 rating"**. Therefore, the product is certified.

[Examination outline]

Test 1 Deodorant performance evaluation of photocatalytic air purifier

○ **Test target:** 7 models of mobile air purifiers that apply photocatalysts
○ Evaluation item: Acetaldehyde concentration in a closed space after the operation of a photocatalytic air purifier
○ **Evaluation method:** Plot the acetaldehyde concentration in the enclosed space with respect to the operating time of the photocatalytic air purifier on a graph, and evaluate the rate of decrease in concentration and the reached concentration.
○ **Test conditions:**
- Clear case with a space of 1 m3 (closed space)
- Test acetaldehyde
- Initial concentration value 5ppm
- Measuring machine Photoacoustic multi-gas monitor (manufactured by Luma Sense Technologies)
- Measurement environment Temperature 25 ℃, humidity 51%

○ **Test result:**
While each model tested showed the effect of reducing the acetaldehyde concentration, the photocatalytic sterilization deodorizer "arc" (arc3-W) of APS Japan Co., Ltd. reduced the acetaldehyde concentration to 1/10 in the shortest time. It was found that it was reduced to the following (0.5ppm or less).

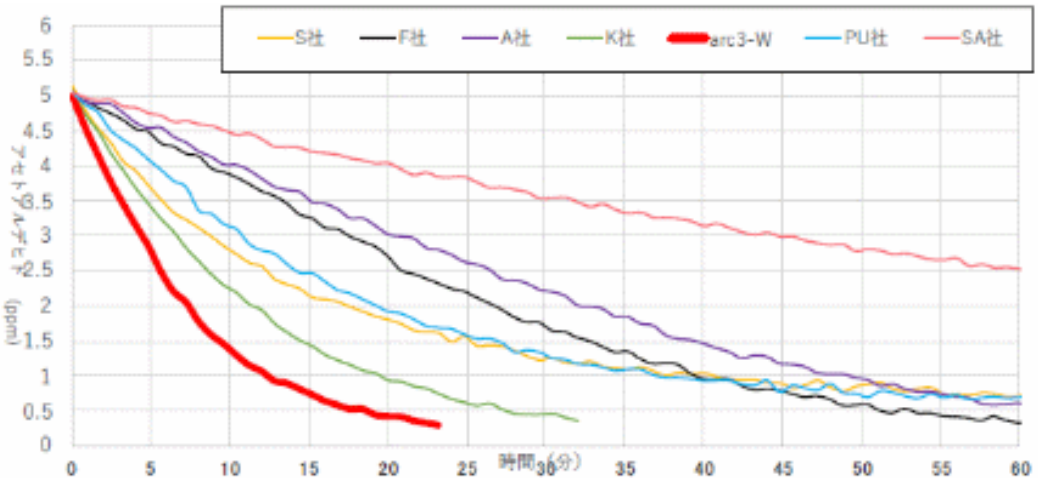

Figure 1. Test results of deodorant performance of photocatalytic air purifier

Test 2 Evaluation of deodorizing strength for various odorous substances

○ **Testing organization:** Narashino Experimental Facility, Specified Nonprofit Corporation Biomedical Science Study Group

○ **Test target:** APS Japan Co., Ltd. "arc (arc3-W)"

○ **Evaluation item:** APS Japan Co., Ltd. “arc (arc3-W)” odor intensity after 1 hour operation

Odor substance ① n-valeric acid (sweat, stuffy body odor, sock-like odor)

Odorous substance ② Ammonia (smell of urine and toilet)

Odor substance ③ Trimethylamine (rotten smell of fish)

○ **Test method:** Add 500 μL of each odor component standard solution (planned by the Off-Flavor Study Group) to a 1 m3 plastic chamber, and add APS Japan Co., Ltd.'s photocatalytic sterilization deodorizer "arc (arc3-W)". Is sampled before and after 1 hour of operation. Four odor judges judge the odor intensity (sensitivity test).

○ **Evaluation criteria:** 6-step odor intensity

0: Odorless

1: Smell that can be finally detected (detection threshold)

2: Weak odor that tells you what the odor is (cognitive threshold)

3: Easily perceptible odor

4: Strong odor

5: Strong odor

○ **Test result:**

Except for the judgment of ammonia by the odor judge B, the odor intensity of various odor components is "0" (odorless), and "arc (arc3-W)" of APS Japan Co., Ltd. is in a predetermined closed space. It turned out that the deodorant performance of is very excellent.

	arc1時間稼働後			
	臭気判定士A	臭気判定士B	臭気判定士C	臭気判定士D
n-吉草酸	0	0	0	0
アンモニア	0	1	0	0
トリメチルアミン	0	0	0	0

Figure 2. Judgment result of odor intensity after "arc (arc3-W)" operation

Test 3 Evaluation of sterilization performance using a full-scale space

○ **Testing organization:** Narashino Experimental Facility, Specified Nonprofit Corporation Biomedical Science Study Group

○ Test target: APS Japan Co., Ltd. "arc (arc3-W)" and two models of air purifiers that use technology different from photocatalyst
○ Evaluation item: Reduction performance against lactic acid bacteria (Lactobacillus plantarum AN3-2 strain)
○ Test method:
(1) Dilute the lactic acid bacterium solution cultured at 37 ° C for 24 hrs 50 times to prepare the test bacterium solution.
(2) Replace the outside air of the 35m³ full-scale space test room for 30 minutes. After that, the intake and exhaust are stopped.
(3) Spray 15 ml of the test bacterial solution in a full-scale space test room with a nebulizer manufactured by Hario Science Co., Ltd. with a particle size of 10 μm or less in 5 min.
(4) Sample ring the initial concentration of 6000 ml for 3 minutes with a precision air sampler, collect the cells with a Millipore filter in front of the air pump, and then incubate in GAM agar medium.
(5) Measure the natural attenuation and carry out a performance evaluation test based on the standards of the Electric Industry Association of the air purifier to be tested and evaluated (N = 5).

○ Test result:
Each model showed the effect of reducing lactic acid bacteria, but it was found that "arc (arc3-W)" of APS Japan Co., Ltd. has a fast reduction rate and excellent reduction performance against lactic acid bacteria.

試験区分	経過時間				減少率	
	15分	30分	45分	75分	30min%	75min%
自然減衰	389	370	352	318	3.1	18.2
APSジャパン arc（arc3-W）	382	10	1	0	97.4	99.9
A社製品	389	25	3	0	93.6	99.9
B社製品	382	39	2	0	89.8	99.9

Figure 3. Test results of lactic acid bacteria reduction performance (table)

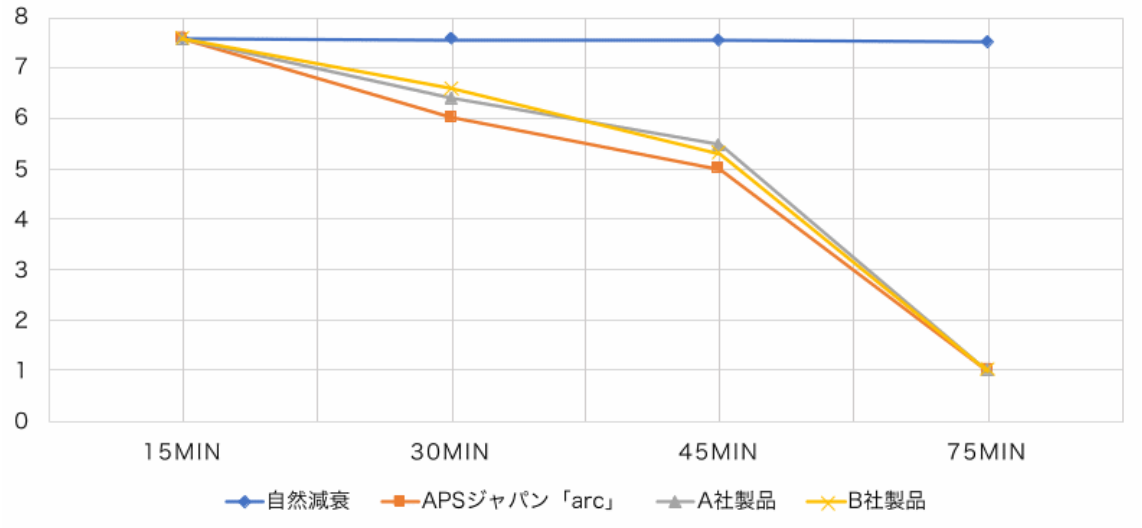

Figure 4. Test results (graph) of lactic acid bacteria reduction performance

* The report showing the details of the test can be downloaded from the website of the Japan Research Organization for Ratings.
https://kakuzukejapan.or.jp/

[About the photocatalytic sterilization deodorizer "arc"]

The photocatalytic sterilization deodorizer "arc" of APS Japan Co., Ltd., which has acquired the Data Premium rating and No. 1 certification, is a mobile air purifier. The biggest feature is the establishment of the world's first binderless titanium oxide carrier method called "Aluminum", which leads to the realization of excellent sterilization and deodorization performance. ..
In April of this year, the company's efforts on aluminum won the Grand Prix, the highest award of the 8th Japan Resilience Award "STOP Infectious Diseases Award".

arc-3 product appearance

arc-X product appearance
(APS Japan Co., Ltd. homepage　https://www.apsjapan.co.jp/arc/)

[About the Japan Research Organization for Ratings]

The Japan Research Organization for Ratings takes up various themes that lead to social benefits and consumer benefits, and based on evidence from expert research and analysis, it selects products, services, local governments, companies, and various organizations. It was established in March 2019 as an organization that evaluates, ranks, and publishes rankings.
Homepage　https://kakuzukejapan.or.jp/

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General Incorporated Foundation Rating Japan Research Organization
[Person in charge] Mari Shibata
[Email address] shibata@kakuzukejapan.or.jp
[TEL] 03-4405-2680