

**ARPACK**<sup>®</sup>  
SUCCESS IN MOTION

# Air cleaning and disinfection devices for medical facilities

Innovative air purifiers based on technology used in space flights

made in Germany

**ARPACK**<sup>®</sup> AirClean

# Why air purifiers?



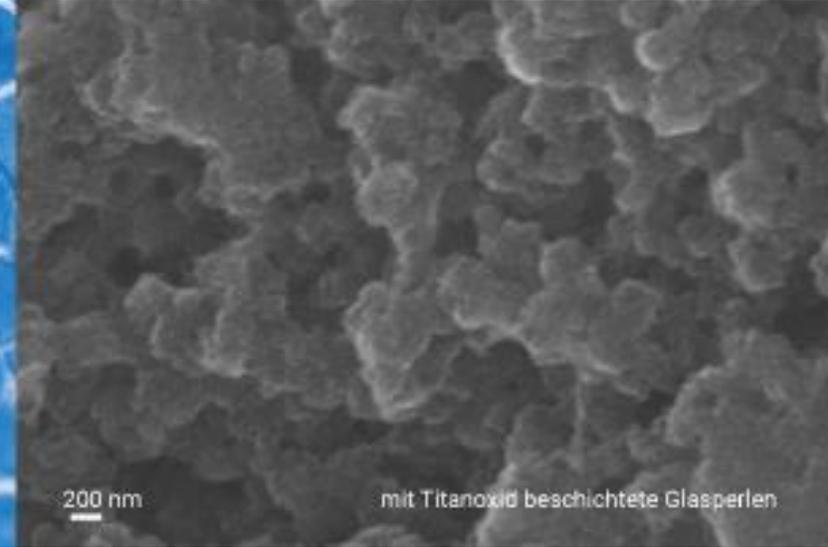
In today's world, especially in the face of the coronavirus pandemic and its mutations, air purification and disinfection plays an increasingly important role.



ARPACK AirClean devices, which are based on aerospace technology, enable ecological, sustainable, highly effective removal of fine dust and microbial air pollutants such as viruses, fungi, bacteria, odors, allergens, formaldehyde, n-heptane, acetaldehyde, acetone and toluene.

# The philosophy of our air purifiers

**ARPACK**<sup>®</sup>

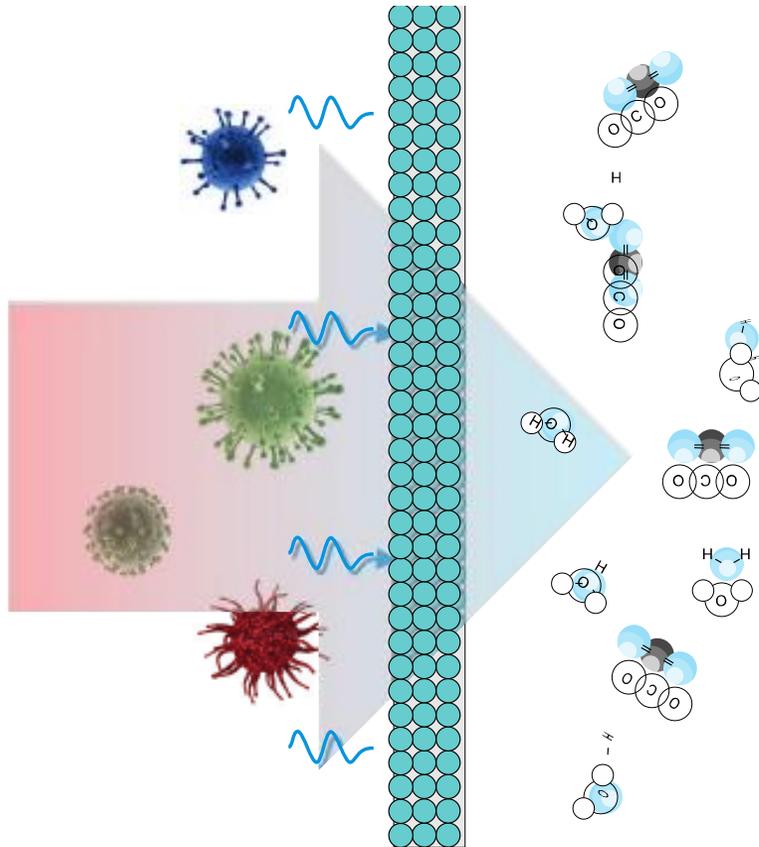


## TiO<sub>2</sub> CARRIER AS THE BASE OF TECHNOLOGY

Based on a patented technology for the mineralization of airborne organic pollutants based on photocatalytic elements made of porous quartz glass under the influence of soft UV-A radiation (365 nm) of the sunlight spectrum.

**ARPACK**<sup>®</sup> *AirClean*

# The philosophy of our air purifiers



The ARPACK-AirClean air purifiers enable effective reduction of microbiological air pollutants without the disadvantages typically found in traditional technologies, which are harmful to the environment and outdated, due to a range of factors such as ozone emission, the use of hard UV-C radiation or expensive, single use HEPA filters.

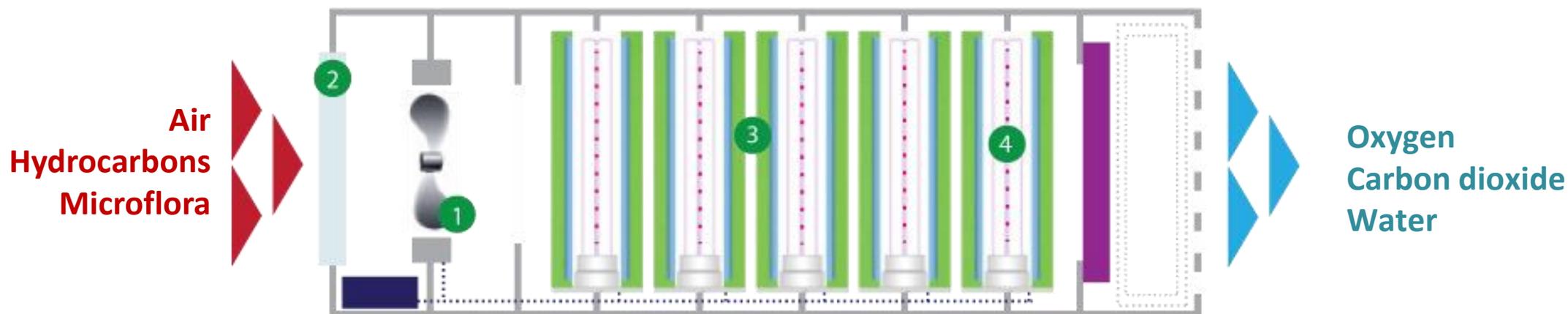
These devices do not contain mercury vapor, as is the case with UV-C lamps – a bi-product of their function harmful to the environment - they do not accumulate any harmful organic substances from the air (including all kinds of microflora) and do not require replacement of the main drive components with continuous use for up to 7 years.

# The philosophy of our air purifiers



## FUNCTIONING SCHEME

The air, set in motion by the fan (1), first passes through the dust filter (2) and then through the porous wall of the photocatalytic glass element (3). Volatile organic compounds, bacteria and viruses in the air are absorbed by the photocatalytic filter and under the influence of the LED UV-A light source (4) are mineralized to the form of carbon dioxide and water vapor.



# The philosophy of our air purifiers

**ARPACK**<sup>®</sup>



## MAIN CONTAMINATION REMOVAL

- Viruses, bacteria, fungal spores
- Aldehydes (including formaldehyde)
- Esters, ketones
- Heterocyclic carcinogens
- Allergens

**ARPACK**<sup>®</sup> AirClean

# Disadvantages of commonly used technologies



## General disadvantages

Noisy, separation of pollutants with reduced filtering function.



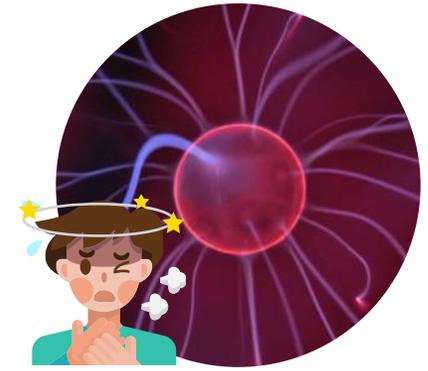
## Using HEPA filters

More frequent and costly replacement of filters in accordance with regulations by specialized personnel is necessary, filters should be disposed of as hazardous waste.



## UV-C radiation

UV-C lamps must be replaced after approx. 8000 operating hours. Each of them contains 2.5 mg of mercury, they must be disposed of as hazardous waste.



## Cold plasma, air ionization

Ozone formation may irritate the respiratory tract causing a cough and headache.

# Technology that inspires

# ARPACK®

## Test report from October 2021



Fraunhofer Institute for Wood Research  
Wilhelm-Klauditz-Institut WKI

Fraunhofer WKI | Bienroder Weg 54 E | 38108 Braunschweig | Germany

Arpack GmbH  
Attn: Herr Steve Hornauer  
Askanischer Platz 4

10963 Berlin

Director  
Prof. Dr. Bohumil Kasal

Bienroder Weg 54 E  
38108 Braunschweig | Germany

Dr. Jan Gunschera

Material Analysis & Indoor Chemistry  
Phone + 49 531 2155-352 | Fax + 49 531 2155-905  
sample\_info@wki.fraunhofer.de  
www.wki.fraunhofer.de

Braunschweig, 01.11.2021

### Test report No. MAIC-2021-2947

Customer: Arpack GmbH, Berlin.

#### Sample description:

WKI no.	Date of reception	Sample Name <small>(this information is provided by the customer)</small>	Product No.	Manufacturer-Code	Date-Stamp
P89825	02.09.2021	ArpackAirClean VR 600	n.a.	n.a.	n.a.

(Sample P89825: paper/cardboard/wrapped separately, wrapping ok; )

Notice: Sample material will be stored for 2 months after test report date. Please contact us if an extended storage time is required or if sample material needs to be returned. Sample material for emission tests cannot be retained for repeated tests, it will only be stored for identification and documentation purposes.

#### Methods:

##### Proceeding

The test was performed following DIN EN 16846 part 1: Photocatalysis - Measurement of efficiency of photocatalytic devices used for the elimination of VOC and odour in indoor air in active mode - Part 1: Batch mode test method in closed chamber; German version EN 16846-1:2017, chapter 7.6. For this purpose, the air cleaner was placed into a 4m<sup>3</sup>-emission test chamber according to DIN EN ISO 16000-9. The chamber was run over night at 23°C and 50% r.h. with an air exchange rate of 0.5/h for conditioning. Afterwards, the device and the air exchange were set off and the compounds acetaldehyde, acetone, heptane and toluene were injected as a liquid mixture. Additionally, formaldehyde was injected in gaseous state. The target

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., München  
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Prof. Dr. rer. publ. as. iur. Alexander Kurz  
Dipl.-Kfm. Andreas Meurer

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concentration was 50 ppb. 15 min after the injection the air cleaner was turned on and the declination curves were monitored for app. 3h.

#### Results:

Ozone was not detected during the complete experiment with a determination limit of 1 µg/m<sup>3</sup>.

The investigations for emissions of volatile organic compounds when the system was running without dosing any compounds at an air exchange rate of 0.5/h, a temperature of 23°C and 50% r.h. showed some ethanol emissions with a concentration of 57 µg/m<sup>3</sup> (30,1 ppb). The concentration decreased within 30 min after having started the test under the determination limit of 1 µg/m<sup>3</sup>. Obviously, ethanol was emitted from a component of the air cleaner and was not generated as a by-product from degradation of one of the doped compounds. For all other compounds except ethanol the concentration was below 5 µg/m<sup>3</sup>. As a result, the generation of by-products was not detected according to the definitions of the standard.

The results from the measurements are shown in **Tab. 1** and **2**.

**Tab. 1: The clean air delivery rates CADR were measured following DIN EN 16846-1 Annex H.**

Compound	Formaldehyde	n-Heptane
CADR (m <sup>3</sup> /h)	19,5	41,7

**Tab. 2: The clean air delivery rates (CADR) were estimated following DIN EN 16846-1 Annex H by linear regression after logarithmic plot of the concentration vs. time.**

Compound	Acetaldehyd	Aceton	Toluen
CADR (m <sup>3</sup> /h)	ca. 25 <sup>*</sup>	ca. 25 <sup>*</sup>	ca. 42 <sup>*</sup>

<sup>\*</sup>) r<sup>2</sup><0,98

In another study performed by WKI, three other air cleaners which were not equipped with an active charcoal filter were tested with different test compounds<sup>1</sup>. The doped concentrations were app. between 30 ppb und 900 ppb. The CADR (clean air delivery rates) in most cases were below 20 m<sup>3</sup>/h, in some cases even below 10 m<sup>3</sup>/h.

Costaramone et al.<sup>2</sup> also have tested air cleaners from the market. Here, besides others, toluene, acetone and n-heptane were used as test compounds. The concentration was app. 250 ppb. For devices running with UVA light the CADR were between 0,8 und 22 m<sup>3</sup>/h.

<sup>1</sup> Gunschera, J., D. Markewitz, B. Bansen, T. Salthammer and H. Ding (2016). "Portable photocatalytic air cleaners: efficiencies and by-product generation." Environmental Science and Pollution Research 23(8): 7482-7493.

<sup>2</sup> Costaramone, N., B. Kartheuser, C. Pecheyran, T. Pigot and S. Lacombe (2015). "Efficiency and harmfulness of air-purifying photocatalytic commercial devices: From standardized chamber tests to nanoparticles release." Catalysis Today 252: 35-40.



Chen et. al. have measured CADR of photocatalytic air cleaners under dynamic conditions over 12h<sup>3</sup>. For form- and acetaldehyde the results were far below 10 m<sup>3</sup>/h, for hexane up to 53 m<sup>3</sup>/h and for toluene up to values barely below 100 m<sup>3</sup>/h.

For all tested compounds the CADR of the device investigated in this study were at the top of such devices which are running without active charcoal filtering.

Officer in Charge

Dr. Jan Gunschera

For the department

Dr. Erik Uhde

## RESULTS OF THE TESTS PERFORMED BY THE FRAUNHOFER-INSTITUT

<sup>3</sup> Chen, W., J. Zhang and Z. Zhang (2005). "Performance of Air Cleaners for Removing Multiple Volatile Organic Compounds in Indoor Air." *Ashrae Transactions* 111(1): 1101-1114.

# RESULTS OF THE TESTS PERFORMED BY THE FRAUNHOFER-INSTITUT



Ozone was not detected during the entire experiment with a limit of quantitation of  $1 \mu\text{g}/\text{m}^3$ .

Devices tested according to DIN EN 16846 for the elimination of formaldehyde, n-heptane, acetaldehyde, acetone and toluene.

Geräte nach DIN EN 16846 getestet auf Beseitigung von Formaldehyden, n-Heptan, Acetaldehyd, Aceton und Toluol.

For all tested substances, the CADR (Clean Air Delivery Rates) of the Arpack AirClean air purifier are without exception in the upper range of the devices tested by the WKI without an activated carbon filter.



NARODOWY INSTYTUT ZDROWIA PUBLICZNEGO PZH  
- Państwowy Instytut Badawczy  
NATIONAL INSTITUTE OF PUBLIC HEALTH NIH - National Research Institute  
Zakład Bezpieczeństwa Zdrowotnego Środowiska  
Department of Environmental Health and Safety

**ATEST HIGIENICZNY** B-BK-60212-0518/21

HYGIENIC CERTIFICATE ORYGINAL

**NATIONAL INSTITUTE OF PUBLIC HEALTH NIH - NATIONAL RESEARCH INSTITUTE**

Wyrób / product: **ARPACK AirClean, modele: AC20, AC40, AC100, AC200, AC400, AC600, AC1200, VR600**

Zawierający / containing: stal malowaną proszkowo, szkło i inne materiały wg dokumentacji producenta

Przeznaczony do / destined: stosowania w pomieszczeniach obiektów podmiotów wykonujących działalność leczniczą, przemysłowych, użyteczności publicznej, biurowych, placówek oświatowo-wychowawczych i rekreacyjno-sportowych

Wymieniony wyżej produkt odpowiada wymaganiom higienicznym przy spełnieniu następujących warunków / the above-named product is acceptable according to hygienic criteria with the following conditions:

Zastosowanie i wykonanie urządzeń musi być zgodne z przepisami dotyczącymi obiektu, w którym są one stosowane. Zastosowanie w obiektach podmiotów wykonujących działalność leczniczą z wyłączeniem pomieszczeń klasy S1. Zalecane jest umiejscowienie urządzeń w sposób, który uniemożliwia kierowanie nawiewu powietrza bezpośrednio na osoby przebywające w pomieszczeniu. Montaż i eksploatacja zgodnie z instrukcją obsługi dołączoną przez producenta. Atest nie obejmuje wymiennych filtrów powietrza innych niż dostarczane przez producenta.

Atest higieniczny nie dot. parametrów technicznych, walorów użytkowych i oceny właściwości alergizujących wyrobu / Hygienic certificate does not apply to technical parameters, utility value and allergenic properties of the product

Wytwórca / producer:

Arpack GmbH  
10963 Berlin  
Askanischer Platz 4, Niemcy

Niniejszy dokument wydano na wniosek / this certificate issued for:

Arpack Polska Sp. z o. o.  
89-100 Słubice  
Osiedle Przemysłowe 10a



Atest może być zmieniony lub unieważniony po przedstawieniu stosownych dowodów przez którąkolwiek stronę. Niniejszy atest traci ważność po 2026.12.02 lub w przypadku zmian w recepturze albo w technologii wytwarzania wyrobu.

The certificate may be corrected or cancelled after appropriate motivation. The certificate loses its validity after 2026.12.02 or in the case of changes in composition or in technology of production.

Data wydania atestu higienicznego: 2 grudnia 2021

The date of issue of the certificate: 2nd December 2021

Kierownik  
Zakładu Bezpieczeństwa Zdrowotnego  
Środowiska

*dr hab. Jolanta Solecka*

dr hab. Jolanta Solecka, prof. NIZP PZH-PIB

Kontakt w sprawie niniejszego atestu higienicznego / To contact regarding this hygienic certificate  
Zakład Bezpieczeństwa Zdrowotnego Środowiska NIZP PZH - PIB / Department of Environmental Health and Safety NIPH NIH - NRI  
00-791 Warszawa, ul. Chocimska 24 / 00-791 Warsaw, Chocimska 24, Poland  
e-mail: sekretariat-bk@pzh.gov.pl tel. +48 22 54-21-354, +48 22 54-21-349

**ARPACK**<sup>®</sup>

HYGIENE CERTIFICATE OF THE  
NATIONAL INSTITUTE OF PUBLIC HEALTH

**ARPACK**<sup>®</sup> AirClean

# Test results from hospitals and clinics



Hospital of Professor Zbigniew Religa in Słubice, Poland



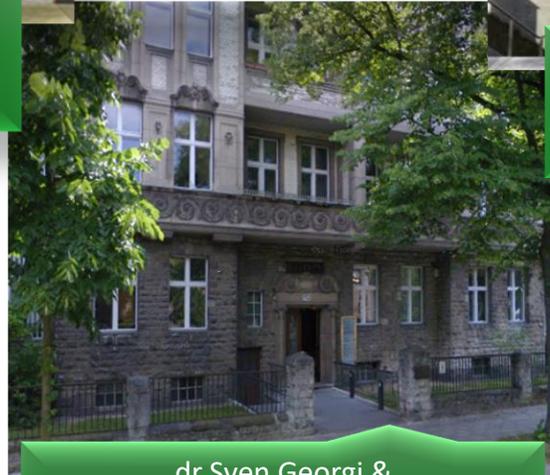
Multidisciplinary Hospital in Gorzow, Poland



Specialist hospital for pneumology and Cardiology in Torzym, Poland



University hospital of Karol Marcinkowski in Zielona Gora, Poland



dr Sven Georgi & dr Thomas Fiedler Clinic Berlin, Germany

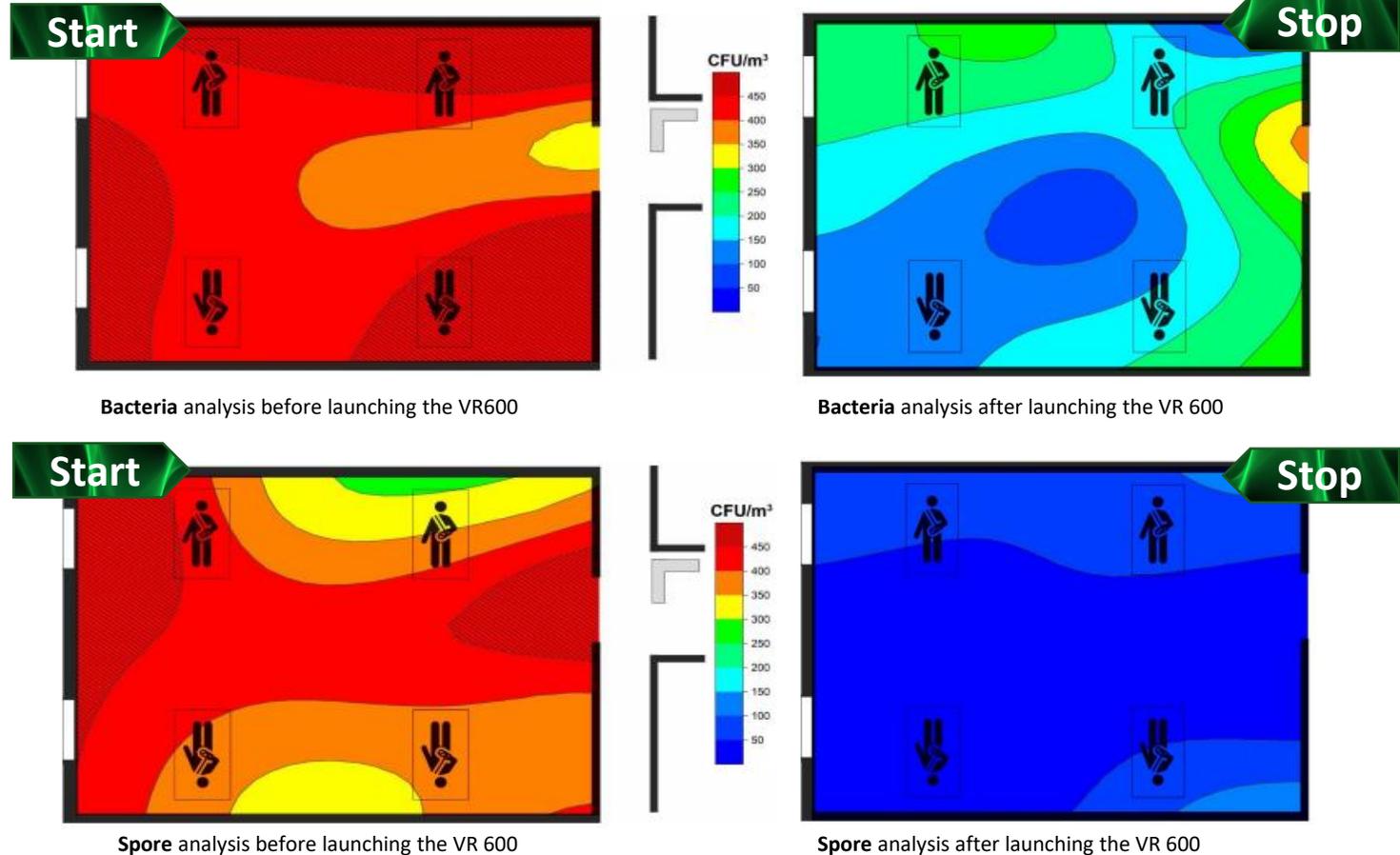
# Hospital of Professor Zbigniew Religa in Słubice, Poland



Test location:  
postoperative room

Reported issue:  
unpleasant smell

Tested device:  
ARPACK AirClean VR600



# Hospital of Professor Zbigniew Religa in Słubice, Poland



## Szpital im. prof. Z. Religi w Słubicach

Republikański Zakład Opieki Zdrowotnej Szpital im. Profesora Zbigniewa Religi w Słubicach sp. z o.o.  
ul. Nadodrzańska 6, 69-100 Słubice, tel. 95 750 14 00, fax 95 750 22 01  
wskazanie@szpitalslubice.pl, www.szpitalslubice.pl

Słubice, dnia 8.09.2021 r.

Szanowni Państwo,

uprzejmie informujemy, że testowane przez nas urządzenie do dezynfekcji i oczyszczania powietrza ARPACK AC40 w sali pooperacyjnej na Oddziale Chirurgicznym Ogólnym NZOZ Szpitalu im. prof. Z. Religi w Słubicach Sp. z o.o. sprawdziło się z dobrym skutkiem.

Celem testu było sprawdzenie skuteczności oczyszczania powietrza ze szkodliwych czynników biologicznych i mechanicznych. Urządzenie ARPACK AC40 zostało zainstalowane w bardzo wymagającym pomieszczeniu na dwa tygodnie w okresie od 12.08.2021 do 31.08.2021.

Test przyrządu ARPACK AC40 został przeprowadzony w rzeczywistych warunkach i wykazał wyraźną poprawę zapachu powietrza, wobec czego można stwierdzić, że urządzenie sprawdziło się w tym zakresie. Niewątpliwie dużym atutem urządzenia jest możliwość jego używania w obecności osób przebywających w danym pomieszczeniu, dzięki zastosowaniu technologii oczyszczania powietrza wykorzystującego promieniowanie UVA (jak promieniowanie słoneczne).

Ponadto urządzenie jest bardzo łatwe w obsłudze, jego montaż nie wymaga wykonania dodatkowej instalacji, może być wykorzystane jako urządzenie stojące lub wiszące. Dalsze testy urządzenia do dezynfekcji i oczyszczania powietrza ARPACK AC40 pod kątem jego właściwości wirusobójczych i bakterioobójczych z badaniami laboratoryjnymi zostaną przeprowadzone w czwartym kwartale 2021 roku.

Z wyrazami szacunku,

Adam Koniak  
Człowiek Zarządu

VIII Wydział Gospodarczy Krajowego Rejestru Sądowego pod numerem KRS 0000350600 Kapitał zakładowy spółki: 2.500.000,00 zł  
NIP 598 16 18 971 REGON 0000445872 BANK 85 0260 11883506 15 8369 0038 0069 5497 2000 0010

"Ladies and Gentlemen,

We would like to kindly inform you that the ARPACK AC40 disinfection and air purification device was tested by us in the postoperative room at the General Surgery Department of the NZOZ Hospital. Prof. Z. Religa in Słubice Sp. z o.o. and it worked to great effect.

The purpose of the test was to measure the effectiveness of its air purification capabilities from harmful biological and mechanical factors. The ARPACK AC40 device was installed in a very demanding room for two weeks from 08/08/2021 to 31/08/2021.

The test of the Arpack AC40 device was completed in real conditions and showed a clear improvement in the smell of the air, showing that the device has proven itself in this area. Undoubtedly, a great advantage of the device is the possibility of using it in a room with multiple people, thanks to the use of air purification technology using UVA radiation (same as solar radiation).

In addition, the device is very easy to use, its assembly does not require additional installation and it can be used as a standing or a hanging device. Further tests of the ARPACK AC40 air disinfection and purification device in terms of its virucidal and bactericidal properties with laboratory tests will be carried out in the fourth quarter of 2021. "



# Specialist hospital for pneumology and Cardiology in Torzym, Poland

**ARPACK**<sup>®</sup>



"Please be informed that from September 29, 2021 to November 15, 2021. The photocatalysis based VR 600 and AC 40 devices from Arpack AirClean were tested for air purification from viruses, bacteria, fungi and formaldehydes based on the principle of photocatalysis were tested at the Specialist Pulmonology and Cardiology Hospital in Torzym.

The test results showed that in the rooms of the Medical Care Unit of our hospital, the level of harmful and unpleasant odors has significantly decreased.

Please send your offers for sale or rental of the devices in question. "

**ARPACK**<sup>®</sup> AirClean

# Dr. Sven Georgi & Dr. Thomas Fiedler Clinic Berlin, Germany

**ARPACK**<sup>®</sup>



“Since September 2020, we have had 5 pieces of your VR 600 devices located in the following rooms:

- Reception
- Large waiting room
- Lab
- Infusion room
- Laboratory / treatment room

Since then, we have not identified any cases of Covid19 infection among our staff. We are fully convinced of the effectiveness of your devices.

The devices fulfil their function very well. Their use does not cause annoying noises and certainly, what should be emphasized, our patients' are guaranteed safety "

**ARPACK**<sup>®</sup> AirClean

# Our devices also work effectively in ...



No.	Client	Room	City	Country	Quantity	Device
1	Logistics company	Office	Berlin	Germany	1	AC 40
2	Scientific laboratory	Office	Berlin	Germany	3	AC 40
3	Scientific laboratory	Office	Berlin	Germany	1	AC 20
4	Private	Living room	Monachium	Germany	2	AC 100
5	Community of architects	Office	Berlin	Germany	2	AC 40
6	Mechanical engineering plant	Conference	Lautert	Germany	3	AC 40
7	Trading company	Conference	Szawle	Lithuania	2	AC 600
8	Lighting design company	Office	Berlin	Germany	1	AC 20
9	Private	Living room	Cottbus	Germany	1	AC 20
10	Private	Living room	Berlin	Germany	1	AC 40
11	Private	Living room	Berlin	Germany	1	AC 20
12	Advertising agency	Office	Berlin	Germany	1	AC 20

# Our devices also work effectively in ...



No.	Client	Room	City	Country	Quantity	Device
13	Private	Living room	Erkner	Germany	1	AC 40
14	Trading company	Conference	Opole	Poland	1	AC 600
15	School	Classroom	Berlin	Germany	1	AC 600
16	Printer	Printer	Berlin	Germany	1	AC 600
17	Medical Community	Therapy room	Berlin	Germany	5	AC 600
18	Driving school	Office	Petersaurach	Germany	1	AC 20
19	Therapy room	Therapy room	Frauenfeld	Switzerland	5	AC 20
20	Service	Office	Wiesbaden	Germany	1	AC 40
21	Water treatment technology	Office	Monachium	Germany	20	AC 20
22	Architects' office	Office	Norymberga	Germany	3	AC 40
23	Therapy room	Therapy room	Mannheim	Germany	1	AC 40
24	Insurance broker	Office	Döbern	Germany	1	AC 20

# Our devices also work effectively in ...



No.	Client	Room	City	Country	Quantity	Device
25	School	Classroom	Berlin	Germany	3	AC 200
26	Trading company	Kantyna	Hamburg	Germany	2	AC 600
27	Carpentry	Office	Bawaria	Germany	1	AC 20
28	Distribution and marketing company	Office	Berlin	Germany	4	VR 600
29	Workspace	Office	Berlin	Germany	4	VR 600
30	Driving school	Classroom	Dornbirn	Austria	1	AC 200
31	Community of architects	Office	Neuendettelsau	Germany	2	VR 600
32	Distribution and marketing company	Living room	Rehfelde	Germany	1	AC 25
33	Trading company	Office	Lustenau	Austria	1	AC 40
34	Driving school	Classroom	Petersaurach	Germany	1	VR 600
35	Production company	Office	Höchst	Austria	2	AC 40

# Competitors | photocatalysis devices



## USA



[molekule.com](https://molekule.com)



[airocide.com](https://airocide.com)



[airgle.com](https://airgle.com)

## GERMANY



[lynatox.de](https://lynatox.de)

## ITALY



[zilfor.com](https://zilfor.com)



[nanohub.it](https://nanohub.it)

# Our air purifiers



## AC 20

Silent 0 dB,

For use in rooms up to 18 m<sup>2</sup>

Cleaning performance up to 12 m<sup>3</sup> / h  
(Also available with wall bracket)



## AC 30

Very quiet despite the 36 dB fan \*

For use in rooms up to 30-40 m<sup>2</sup>

Cleaning performance up to 40 m<sup>3</sup> / h  
mobile, versatile



## AC 40

Silent 0 dB

For use in rooms up to 28 m<sup>2</sup>

Cleaning performance up to 20 m<sup>3</sup> / h  
(Also available with wall bracket)

\* measured at a distance of 1 m

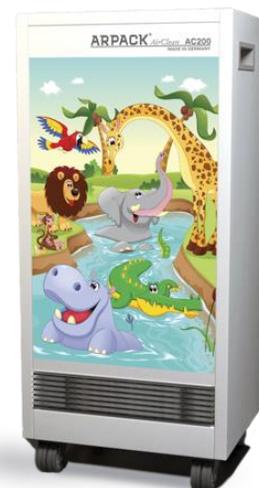
# Our air purifiers

**ARPACK**<sup>®</sup>



## AC 50

Very quiet despite the fan 38 dB \*  
For use in rooms up to 40 m<sup>2</sup>  
with a remote control  
Cleaning performance 40 m<sup>3</sup>/h / 100 m<sup>3</sup>/h



## AC 200

Very quiet 36 dB\*  
For use in rooms up to 50 m<sup>2</sup>  
Cleaning performance 100m<sup>3</sup>/h



## AC 400

Very quiet 38 dB\*  
For use in rooms up to 80 m<sup>2</sup>  
Cleaning performance 160 m<sup>3</sup>/h

\* measured at a distance of 1 m

**ARPACK**<sup>®</sup> AirClean

# Our air purifiers

**ARPACK**<sup>®</sup>

## AC 600

Very quiet 38 dB –52 dB,  
For use in rooms up to 250m<sup>2</sup>,  
Cleaning performance 400 m<sup>3</sup>/h -1500 m<sup>3</sup>/h



\* measured at a distance of 1 m

**ARPACK**<sup>®</sup> AirClean

# Why is it worth choosing our devices?



## ADVANTAGES

- ❑ Maintenance-free for 7 years
- ❑ No subsequent costs
- ❑ Made in Germany - Berlin
- ❑ Sustainable & ecological
- ❑ Outstanding test results
- ❑ No environmental pollution by HEPA filters or UV-C lamps
- ❑ All air purifiers are available in 4 RAL colors: Alpine White, Medium Blue, Signal Gray and Graphite Gray.

# Application areas of air purifiers

**ARPACK**<sup>®</sup>



**Public institution**



**Hospitals**



**Doctors offices**



**Schools and kindergartens**



**Sports halls and fitness clubs**



**Events**



**Industrial factories**



**Public transportation**



**Hotels and guesthouses**



**Office buildings**

**ARPACK**<sup>®</sup> *AirClean*



**ARPACK**<sup>®</sup>  
SUCCESS IN MOTION

Thank you for your attention and your  
trust in  
**ARPACK**<sup>®</sup>

**ARPACK**<sup>®</sup> AirClean