

# POTOK AIR DECONTAMINATION TECHNOLOGY USED BY NASA DESTROYS SARS-COV-2 AND ALL OTHER VIRUSES, BACTERIA, AND MOLD

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# POTOK AIR DECONTAMINATION PATENTED TECHNOLOGY

## DESTROYS 99.9% OF ANY TYPES OF AIR-BORNE MICROORGANISMS, INCLUDING BACTERIA, VIRUSES, MOLD AND YEAST



Fig. 1 Schematic view of POTOK technology elements

#### **Decontamination procedure**

The airflow passes through constant electric fields created by transversely arranged airpermeable electrodes made from highly-porous electrically conductive foamed metal plates. The electrodes are connected to a high-voltage power source so that they have alternating electrical polarity.

In two-section charging chambers, microorganisms' surfaces and intracellular and molecular structures are repeatedly recharged, which leads to inactivation (destruction of certain biological activities) of all microorganisms' types, including viruses. An electrostatic precipitator catches the destroyed biomass.

The dielectric porous plates placed between the electrodes are used to precipitate the destroyed biomass, aerosols and to avoid of breakdowns in case of high airflow's humidity and dustiness level.

#### POTOK technology was tested by major scientific research institutes all over the world:

East Bavarian Technical University of Applied Sciences Amberg-Weiden (Germany), National Institute of Public Health (Hungary), Conformity laboratories (Korea), Harvard School of Public Health (USA), State institute of tuberculosis (Russia), Institute of virology named after Ivanovskiy (Russia), Institute of epidemiology and microbiology named after Gamaley (Russia), etc.



# POTOK AIR DECONTAMINATION TECHNOLOGY

DESTROYS 99,9% OF ANY TYPES OF AIR-BORNE MICROORGANISMS, INCLUDING BACTERIA, VIRUSES, MOLD AND YEAST



poto<u>k</u>

01 Effectiveness of inactivating microorganisms at least 99.9%\*

02 **Nonselectivity** destruction of all types of microorganisms, including coronaviruses and molds\*\*

03 **Durability** service life of the equipment is 10 years, no expendables needed

04 **Environmentally friendly** no chemicals are used for inactivation, equipment does not require special disposal 05 Filtration (of the destroyed biomass) effectiveness similar to H11-H14 class filters

06 **Safety** work in the presence of people

07 Automatic control over inactivation effectiveness and adaptation to environmental parameters

08 Energy saving

the equipment consumes a minimum of electricity (10 W)

\* According to tests taken by Scriabin Institute of Biochemistry and Physiology of Microorganisms (Russia)

\*\* According to science opinion provided by Research Institute of Influenza (Russia)



# POTOK IN SOCIAL AND ADMINISTRATIVE INSTITUTIONS

## **Problem description**

Every year, millions of people suffer from acute upper respiratory tract infections and influenza. COVID-19 has significantly increased the economic damage to society from airborne infections.

## **Fields of application**

01 Kindergartens and schools
02 Office buildings
03 Banks and insurance companies
04 Nursing homes
05 Hotels, hotels and apartments
06 Museums, galleries, theaters, sport centers
07 Public and government buildings, etc.



# POTOK IN SOCIAL AND ADMINISTRATIVE INSTITUTIONS

RESULTS OF USING POTOK TECHNOLOGY









# Number of missed classes due to illness 1st grade students 2016-2017 school year

% of sick students 1st grade (December 13, 2016 - January 31, 2017)



# **POTOK CLIENTS**

In social and administrative institutions

#### **REFERENCE LIST**

potok

01 INTERNATIONAL SPACE STATION (ROSCOSMOS AND NASA SEGMENTS)

#### 02

MEMORIAL MUSEUM OF COSMONAUTICS, BOLSHOI DRAMA THEATER NAMED AFTER TOVSTONOGOV, MOSCOW ZOO AND OTHER CULTURAL AND ENTERTAINMENT FACILITIES

#### 03

INNOPOLIS UNIVERSITY, NEW SCHOOL, NIZHNY NOVGOROD CADET CORPS NAMED AFTER GENERAL OF THE ARMY MARGELOV AND OTHER EDUCATIONAL INSTITUTIONS

#### 04

LES TROIS SANTES FITNESS CLUB AND OTHER SPORT CENTERS 05 NURSING HOMES IN SERBIA AND THE NETHERLANDS

#### 06

SBERBANK, INTERNATIONAL FINANCIAL CLUB BANK, AND OTHER CREDIT ORGANIZATIONS

#### 07

SOGAZ, URALSIB INSURANCE, AND OTHER INSURANCE COMPANIES

#### 08

N-TV CHANNEL, VDNKH, AND OFFICES AND SITES OF OTHER PRIVATE AND PUBLIC ORGANIZATIONS, AND MANY OTHER INSTITUTIONS



POTOK for Russian bank which provides services to more than 100,000 corporate and over 2 million private customers



**POTOK INSTALLATION AREA:** clients' zones, back office, cash registers

> The project is designed to use POTOK SAP120 standalone devices



## **CLIENT'S BENEFITS:**

01 Preventing the spread of dangerous microorganisms through air conditioning systems

02 Individual protection against bacteria and viruses in the workplace for employees and clients

03 Decrease in the incidence of ARVI and influenza among employees and the economic losses caused by sick leaves of them

04 Support for brand reputation



Potok for elite nursing home Holland Zorggroep (Holland)



Eelite nursing home Holland Zorggroep (Holland)

**POTOK INSTALLATION AREA:** residents' apartments

The project is designed to use POTOK SAP120 standalone devices



## **CLIENT'S BENEFITS:**

01 At the height of the COVID-19 epidemic, residents of apartments with Potok equipment did not get infected with a virus dangerous for their age (unlike residents of rooms not equipped with Potok).

02 Increase the attractiveness of the institution for potential customers.



POTOK for luxury hotel and residences in Russia



\*The facility is under construction

# POTOK INSTALLATION AREA:

supply air duct in front of the air distribution grid of each premise

The project is designed to use POTOK FED180 – FED900 induct mount devices



#### **POTENTIAL CLIENT'S BENEFITS:**

01 Extension of the service life of rooms and common areas
02 Destruction of mold in hot and humid environments
03 Elimination of legionella bacteria in air conditioning systems
04 Competitive advantage for target audience



POTOK for elementary school in Russia



Potok SAP130 standalone unit in elementary school

# **POTOK INSTALLATION AREA:** classrooms

#### **MICROBIOLOGICAL TEST RESULTS:**

14 times reduction of bacterial count in the classroom and 10 times less mold in the classroom

### **CLIENT'S BENEFITS:**

01 Burden children's disease decreased 2 times

02 Improving the well-being of children with weakened immunity, suffering from asthma or allergies

03 Decrease in the risk of viruses and bacteria being spread among students, especially during periods of reduced immunity and outbreaks of viral diseases

potok

POTOK for International Space Station



Potok space standalone unit on the ISS's board (NASA segment)

#### **POTOK INSTALLATION AREA:**

Zvezda Service Module (ROSCOSMOS segment) and Functional Cargo Block (NASA segment)

#### MICROBIOLOGICAL TEST RESULTS:

in one week of operation, the unit reduced the level of molds in the air to zero (tenfold permissible contamination excess was previously recorded)

#### **CLIENT'S BENEFITS:**

01 Microbiological purity and low level of microbial contamination of the air in the orbital station

02 Decrease in the risk of bacteria and fungi penetrating with cargo delivered to the orbital station

03 Improving the well-being of cosmonauts and astronauts



# **POTOK IN HEALTHCARE**

## **Problem description**

COVID-19, along with nosocomial infections, is the most important problem of modern medicine. The economic damage is estimated in the billions of dollars. At the same time, 30% of all cases of such diseases can be completely avoided. In particular, those that depend on the air quality.

## **Fields of application**

01 Operating departments
02 Neurosurgery Departments
03 Intensive Care Units
04 Burn wards
05 Maternity wards
06 Neonatal Units
07 Hematology departments

08 Oncology departments
09 Infectious diseases departments
10 Microbiological and embryological laboratories
11 Central sterilization departments
12 Departments of Reproductive Technologies
13 Doctors ' offices
14 Polyclinics, pharmacies, etc.



# **POTOK IN HEALTHCARE**

RESULTS OF USING POTOK TECHNOLOGY



#### BOTKIN HOSPITAL (MOSCOW) AND CITY CLINICAL HOSPITAL NO.1 (MOSCOW)

1300 surgeries

world average

rate

(implantation of endoprosthesis of large joints)

# LEVEL OF POSTOPERATIVE SEPTIC COMPLICATIONS (WOUND INFECTION):

3.5% - 4%	0.15%
before	using
installing	«POTOK»
«POTOK» devices	devices
1%	

Source: Source: Kuzin V.V. et al. Knee joint endoprosthesis: mistakes and complications // Traumatology and orthopedics: today and in the future (International Congress Materials) – Moscow, 2003.



## **POTOK IN HEALTHCARE**

RESULTS OF USING POTOK TECHNOLOGY

potok

### OPERATION ROOM AT THE OSTBAYERISCHE TECHNISCHE HOCHSCHULE (GERMANY) AND RUSSIAN HOSPITAL #24 (RUSSIA)



■ Without Potok device ■ With P

With Potok device



# Comparison of the bacterial contamination (CFU/m<sup>3</sup>) of the room air in the OR in Germany

# Comparison of the bacterial contamination (CFU/m<sup>3</sup>) of the room air in the OR in Germany

Source: Ostbayerische Technische Hochschule Amberg-Weiden: Experiments for the evaluation of effectiveness for the Potok system. - 2017.14



# POTOK CLIENTS In healthcare

#### **REFERENCE LIST**

poto ( ot 01 CENTRAL RESEARCH INSTITUTE OF EPIDEMIOLOGY (RUSSIAN LABORATORY FOR RESEARCH OF SARS-COV-2)

### 02

INFECTIOUS DISEASES CLINICAL HOSPITALS OF MOSCOW NO. 1 AND NO. 2 (THE LARGEST HOSPITALS IN MOSCOW ASSISTANCE TO PATIENTS WITH INFECTIOUS DISEASES, INCLUDING PARTICULARLY DANGEROUS INFECTIONS)

#### 03

SWISS UNIVERSITY CLINIC, MEDSI GROUP OF COMPANIES, MOTHER AND CHILD CLINICS (RUSSIA) 04 AKFA MEDLINE MULTIDISCIPLINARY MEDICAL CENTER, TASHKENT (UZBEKISTAN)

#### 05

**10TH CITY CLINICAL HOSPITAL,** MINSK (BELARUS)

#### 06

N. N. BLOKHIN CANCER CENTER, MOSCOW (RUSSIA)

#### 07

**EMERGENCY HOSPITAL,** RYAZAN (RUSSIA)

AND MANY OTHER INSTITUTIONS



POTOK for Research Institute of Epidemiology in Russia



Research Institute of Epidemiology

**POTOK INSTALLATION AREA:** laboratories for SARS-CoV-2 studies

> The project is designed to use POTOK FAS900 standalone devices



### **CLIENT'S BENEFITS:**

01 Preventing the spread of SARS-CoV-2 by air

02 Individual protection against the virus in the workplace for scientists

03 Decrease in the incidence of ARVI and influenza among employees and the economic losses caused by sick leaves of them



POTOK for Children's cancer and hematology hospital in Russia



Potok SAP130 standalone unit in the children's ward

#### **POTOK INSTALLATION AREA:** Children's wards, lock chambers

The project is designed to use POTOK SAP130 standalone devices



## **CLIENT'S BENEFITS:**

01 The concentration of molds in wards was reduced to 0

02 By 3.7 times total microbial count in wards was reduced

03 By 4.3 times concentration of mold fungi in the lock chamber before the rooms was reduced

04 By 17.8 times total microbial count in the lock chamber before the rooms was reduced



POTOK for Dental clinic in Russia



Potok SAP130 standalone unit in the dental clinic, Moscow

**POTOK INSTALLATION AREA:** Dental operation room, near the chair



## **CLIENT'S BENEFITS:**

01 The risk of nosocomial infections decreases

The project is designed to use POTOK SAP130 standalone

devices

02 Treatment effectiveness increases

03 Support for brand reputation



POTOK for City clinical hospital in Republic of Belarus



City clinical hospital, Minsk

**POTOK INSTALLATION AREA:** integration into existed centralized inflow exhaust ventilation

> POTOK devices integrated into the gap of the ventilation channel at the mechanical floor

#### **CLIENT'S BENEFITS:**

01 The risk of nosocomial infections decreases

02 Treatment effectiveness increases

03 The recovery process is accelerated (hospital bed turnover increases)





POTOK for AKFA Medline Multidisciplinary Medical Center in Uzbekistan



AKFA Medline Multidisciplinary Medical Cente, Tashkent **POTOK INSTALLATION AREA:** ventilation of the surgery block, consisting of 7 modern operating rooms.

> Duct installations and Potok laminar ceilings supply decontaminated air to the working area of clean rooms, which are subject to increased requirements for the microbiological purity of the air environment.

#### **CLIENT'S BENEFITS:**

- **01** Compliance with international standards for patient safety.
- **02** Implementation of a set of preventive measures aimed at breaking the mechanism of transmission of nosocomial infections.
- 03 Maintaining a low level of operating costs for the air disinfection system.



# potok BIOINACTIVATE

# **INTEGRATION CASE STADY**

POTOK for Emergency hospital in Russia



Emergency hospital, Ryazan

### POTOK INSTALLATION AREA:

terminal air distribution devices integrated into centralized inflow exhaust ventilation (laminar flow units)

> POTOK LAD8640 device discharges the unidirectional airflow at a speed from 0.24 to 0.3 m/s into the working area of clean rooms (surgical table zone)



## **CLIENT'S BENEFITS:**

01 The risk of nosocomial infections decreases

02 Treatment effectiveness increases

03 The recovery process is accelerated (hospital bed turnover increases)



# POTOK IN FOOD INDUSRTY

## **Problem description**

Mold and spoilage of food products before the expiration date their shelf life, high level of defects and returns are the main problems of most manufacturers. To solve them, many people spend serious effort and money on employee hygiene and surface disinfection.

At the same time, the air quality is rarely paid attention to. However, it is the dirty air of production that is the source of mold, yeast and bacteria, which, when they get on the product, lead to its rapid deterioration, significantly reducing the shelf life.

## **Fields of application**

01 Dairy plants
02 Cottage cheese, butter and cheese production
03 Poultry and meat processing enterprises
04 Confectionery factories
05 Seafood Production plants
06 Mushroom farming and other food enterprises



# **POTOK CLIENTS** In food industry

#### **REFERENCE LIST**

potok

#### 01 PEPSICO

(POTOK UNITS WERE INSTALLED IN PACKAGING LINES OF PEPSICO DAIRY PRODUCTS: HASSIA, TREPKO AND TAURAS-FENIX LINES)

#### 02

**DANONE** (DAIRY PRODUCTION AREAS)

### 03

ELEFTHERIOU ELEFTHERIOS, CYPRUS (YOGHURT PRODUCTION AREA)

#### 04

PICK SZEGED ZRT., HUNGARY (Salami testing laboratory)

## 05 MOLODECHNO DAIRY PLANT, BELARUS (CHEESE PACKAGING AREA)

#### 06

**PRODO Group** (SAUSAGES SLICING AREA, SAUSAGES CHILL ROOM, CHICKEN MEAT PROCESSING AREA)

#### 07

KHLEB NASUSHCHNY BAKERY (REFRIGERATION CHAMBER FOR THE SEMI-FINISHED BAKED PRODUCTS)

#### 08

**BOGORODSKY MEAT PROCESSING PLANT** (SAUSAGES SLICING AND PACKAGING AREA)



# POTOK IN FOOD INDUSRTY

POULTRY AND MEAT PROCESSING Meat is an excellent breeding ground for microorganisms, including pathogenic ones. The air contaminated with microorganisms prevents manufacturers from providing a consistently high quality of the product: there are problems such as slime, mold, gray-green color of minced meat, etc.



## **RESULTS:**

+ 100%

to the shelf life of chilled semi-finished products

#### + 66%

to the shelf life of chilled poultry products

#### by 2 times

the geography of sales has been expanded

#### to 0

reduced returns from online retail

#### Shelf life of poultry products (days)



# POTOK IN FOOD INDUSRTY

#### **DAIRY INDUSTRY**

In order to assess the reduction of the level of microbial air pollution in contact with the product, the Experimental Cheesemaking Plant conducted research on the operation of the Potok equipment in the butter packaging room and in the cheese-making shop in 2016.



#### Air quality measurements (CFU/50 L)

## **RESULTS:**

#### by 106 times

reduced concentration of total viable count in the cheese-making shop

#### by 40 times

reduced concentration of total viable count in the butter packaging room

#### by 18 times

reduced concentration of mold in the cheese-making shop

#### by 15 times

reduced concentration of mold in the butter packaging room



POTOK for Russian plant of the European multinational food-products corporation



**POTOK INSTALLATION AREA:** dairy products manufacturing and packaging

> The project is designed to use POTOK FAS1000 standalone devices in stainless steel housings



## **CLIENT'S BENEFITS:**

01 Reduced concentration of mold fungi and yeasts, bacteria and viruses in the air

02 Increase in the shelf life of products

03 Protection against the viruses in the workplace for staff



POTOK for the leader of dairy industry in the Republic of Belarus and one of the largest manufacturers of natural dairy products in the Eastern European region



POTOK FED6500 device integrated into the gap of the ventilation channel at the mechanical floor



#### **POTOK INSTALLATION AREA:**

integration into existed centralized inflow exhaust ventilation

### MICROBIOLOGICAL TEST RESULTS:

reduction of microorganisms concentration (mold and yeast) in the air to 0 CFU/m<sup>3</sup>



POTOK for one of the largest food holdings in Russia, specializing in the snacks and confectionery production



POTOK independent air decontaminating recirculation system

**POTOK INSTALLATION AREA:** an independent air decontaminating recirculation system

(this technical solution is suitable for places, where there are a lot of microorganisms' producing sources (such as people or packaging materials) and when it is necessary to provide people or products with 100% decontaminated air)



### **MICROBIOLOGICAL TEST RESULTS:**

reduction of microorganisms concentration (mold and yeast) in the air to 0 CFU/m<sup>3</sup>

### **CLIENT'S BENEFITS:**

01 Increase in the shelf life of products

02 Decrease in product losses

# potok BIOINACTIVATIO

# **INTEGRATION CASE STADY**

POTOK for poultry farm in Russia



POTOK independent air decontaminating recirculation system

POTOK INSTALLATION AREA:

integration into existed centralized inflow exhaust ventilation



reduction of mold concentration in the air from 61 CFU/petrie dish to 1 CFU/petrie dish

### **CLIENT'S BENEFITS:**

01 Increased product's shelf life from 5 to 7 days

02 Cost saving by losses reduction

03 Increased product quality and brand reputation





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