



Innovative systems of cleaning and
disinfection of air of Kazakhstan production



Creation of clean rooms (CLEAN ROOM)

Technical characteristics and description of applied materials





CHARACTERISTICS OF THE COMPANY

LLP "Tenre-Airlife" is the first Kazakh Research and Production Company. We deal with production, design and service of innovative cleaning systems and air disinfection on the basis of photocatalysis technologies.

We are constantly improving the manufactured equipment and conduct research on the development of new highly effective methods and technologies for air filtration.

*One of the main directions of our work: design, construction and operation of **clean rooms** for medical, research laboratories and industry.*

Our clients: Nazarbayev University, National Medical Holding, National Biotechnology Center, "Antigen" bio vet center and other famous medical and science centers



CHARACTERISTICS OF THE COMPANY



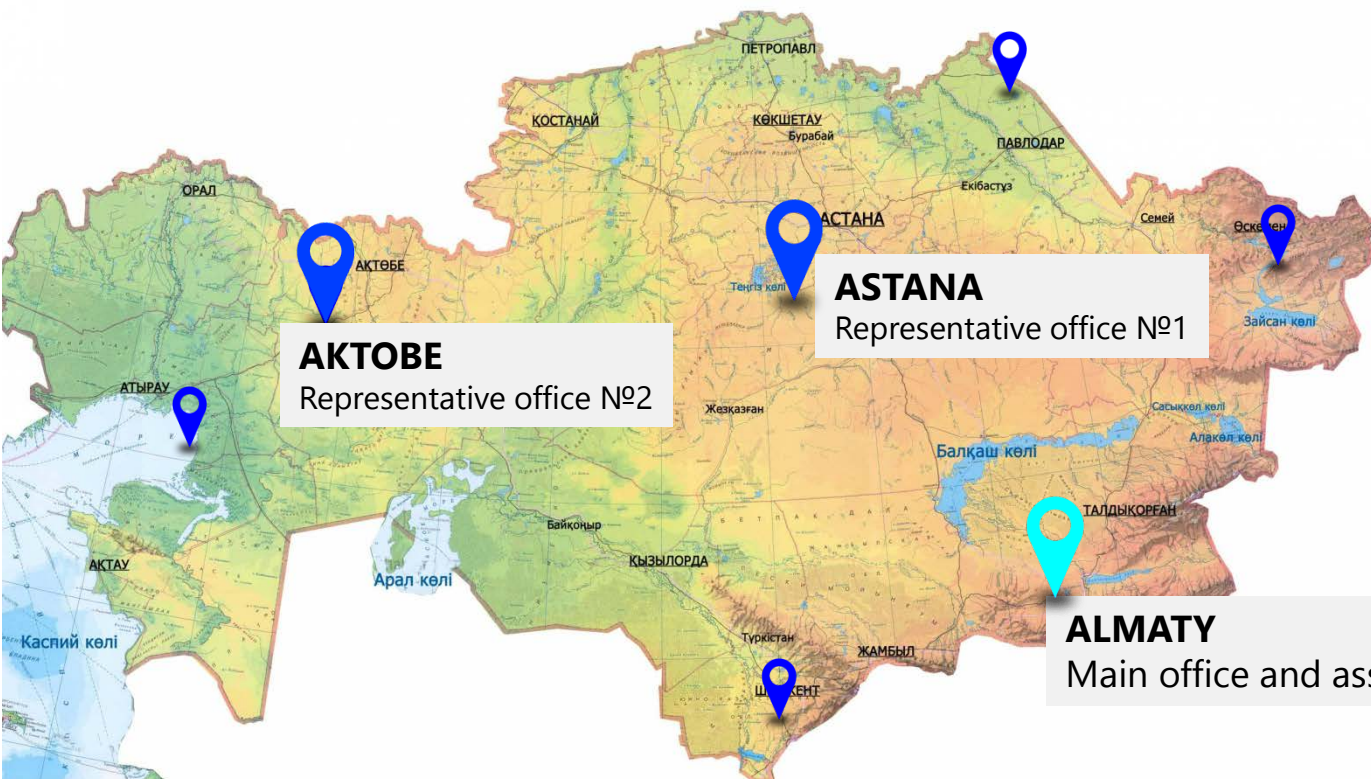
Start of work in Kazakhstan: 2012



Number of front office: 10 people

Technical specialists and engineers: 10 people

Installation and service group: 100 people



Presence geography:

- Main office and assembly space: Almaty
- Representative offices: Astana
Aktove
- Dealer network in all regions of Kazakhstan



NAZARBAYEV UNIVERSITY
RESEARCH AND INNOVATION
SYSTEM – biolaboratory
Astana



Laboratory with the level of biological
safety BSL-3
Ministry of Education and science RK
Almaty region, p.t. Guards



NAZARBAYEV UNIVERSITY
RESEARCH AND INNOVATION
SYSTEM – clean rooms,
nanosinergy laboratory
Astana



Almaty oncology centre - operating unit,
resuscitation



The Institute of Human
Reproduction "Eco Center
Almaty" - operating unit and
laboratory of embryology
Almaty



Republican Children's Clinical Hospital
"Aksai" KazNMU named after SD.
Asfendiyarov - operating units, intensive
care unit
Almaty



Institute of Molecular Biology and
Biochemistry M.A. Aitkhozhina -
laboratory of functional genomics,
Almaty



National Center for Biotechnology -
more than 10 laboratories of various
purity classes
Astana



Institute of Molecular Biology and
Biochemistry M.A. Aitkhozhina -
genome laboratory
Almaty



National Scientific Center of Maternity
and Childhood, department of pediatric
hemato-oncology
Astana



Clean room is the room specially designed, constructed and used, and staffed with special engineering systems and equipment.

Calculating concentration of the aerosol particles and the concentration of viable microorganisms in the air is maintained within not more than the specified value, corresponding to a certain class of cleanliness, and wherein, as appropriate, is controlled by other parameters (e.g., temperature, relative humidity and differential pressure).

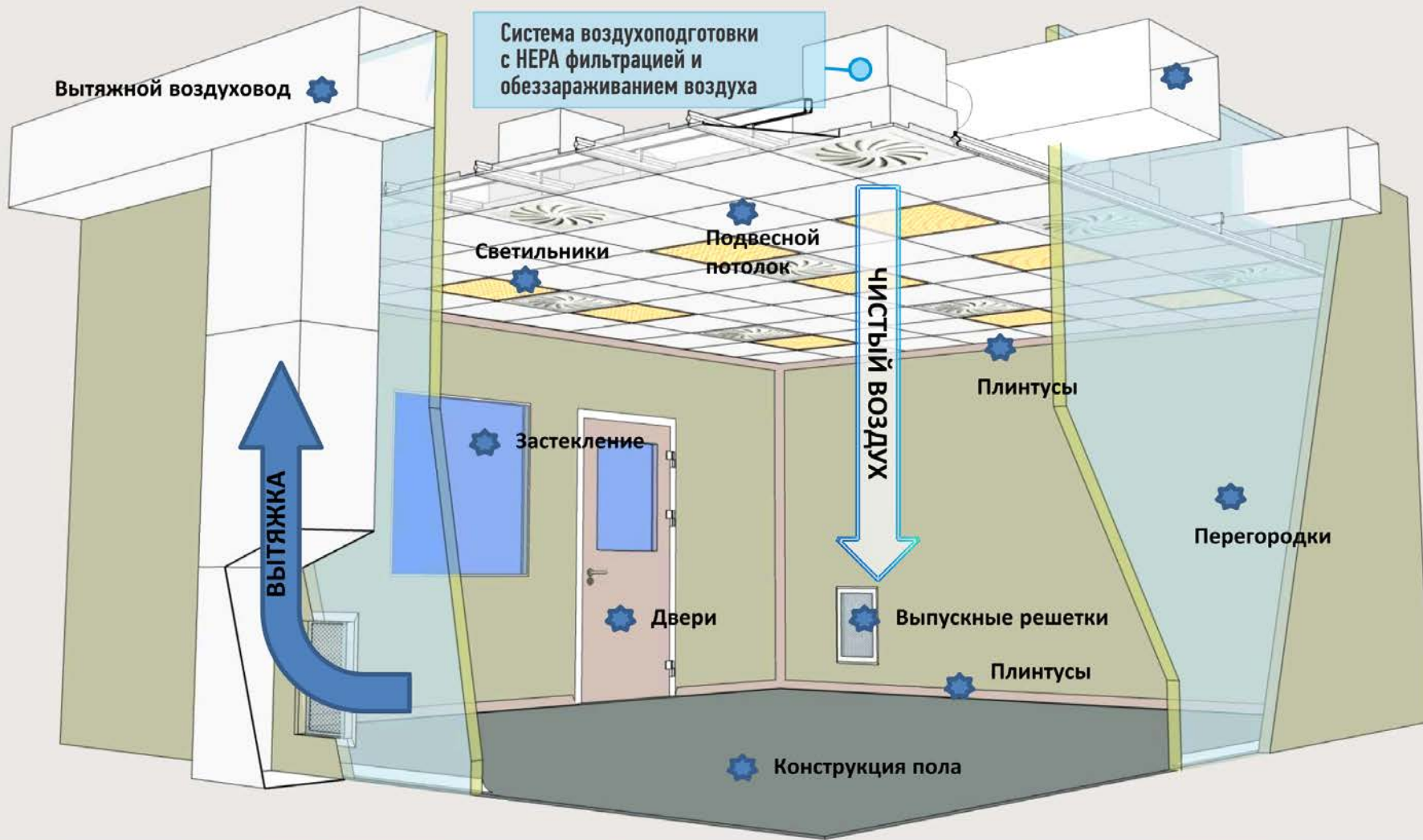
In medicine, the most common standard for clean room is the class

ISO 5, ISO 6

On the territory of the CIS it is regulated standard GOST R 52539-2006



SCHEME OF THE AIR CLEANING IN CLEAN ROOMS





Inscriptions on the picture

- Вытяжной воздуховод - exhaust air duct
- Вытяжка - air extraction system
- Застекление – glassing
- Подвесной потолок – suspended ceilings
- Светильники – light fixtures
- Чистый воздух – clean air
- Перегородки – partitions
- Плинтусы – plinths
- Двери – doors
- Конструкция пола – construction of the floor
- Выпускные решетки – exhaust grilles
- Система воздухоподготовки с HEPA фильтрацией и обеззараживанием воздуха - air handling system with HEPA filtration and air disinfection

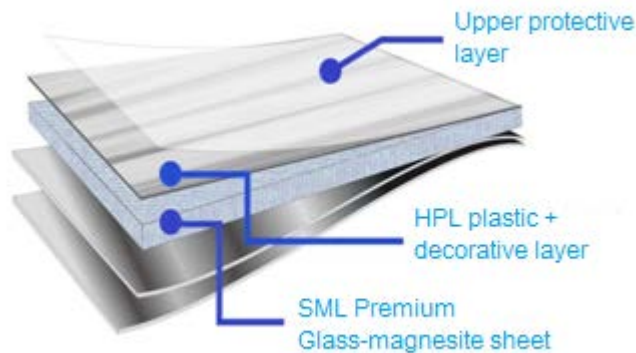
WALL ENCLOSURES OF THE ERC: Possible variants:

- **Variant 1 (premium):**
 - HPL-plastic - Fundermax GmbH (Austria)
- **Variant 2 (standart):**
 - UVK-panel - Wall plaster-metal panels Ingermax (Russia)

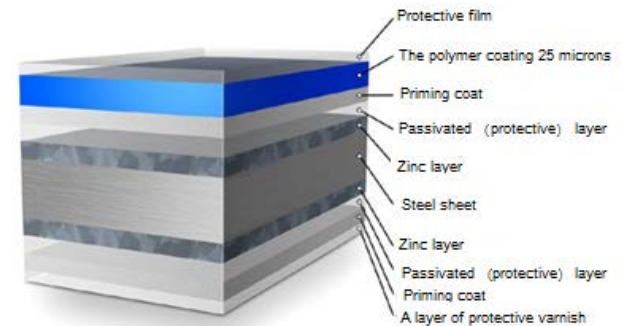
Automation and Drives of sliding and swing doors, locks - Dorma (Germany) - in any of the two variants of wall panels.

Tenre-Airlife – official partner of german clean room producer – Viessmann Technologies

Variant 1



Variant 2



Manufacturer : **FUNDERMAX** (Austria)

Manufacturer : **INGERMAX** (Russia / Germany)



Variants of wall enclosures of clean rooms

Variant 1: HPL

Color solutions: limited by the palette of manufacturer



Variant 2: GML

Color solutions: any color of RAL system





Enclosing constructions of clean rooms

DOORS

In clean rooms are used sealed, mechanical or automatic doors in sliding or swing configuration.

The material used for doors and pass-through windows is metal with a hygienic coating, glass.



CEILING

The standard for ceiling of clean rooms are metal cassette suspended ceilings.

The main criteria are tightness and protection of the working area of the clean rooms from building structures and external factors



FLOOR

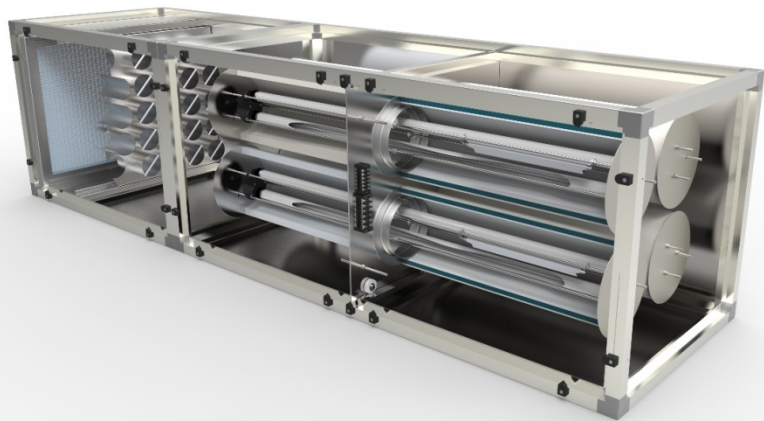
In clean rooms are used anti-static wear-resistant floor coverings that are resistant to abrasion and disinfection process.

Applicable material: PVC linoleum (rolled linoleum or tiles)





SYSTEM OF AIR HANDLING

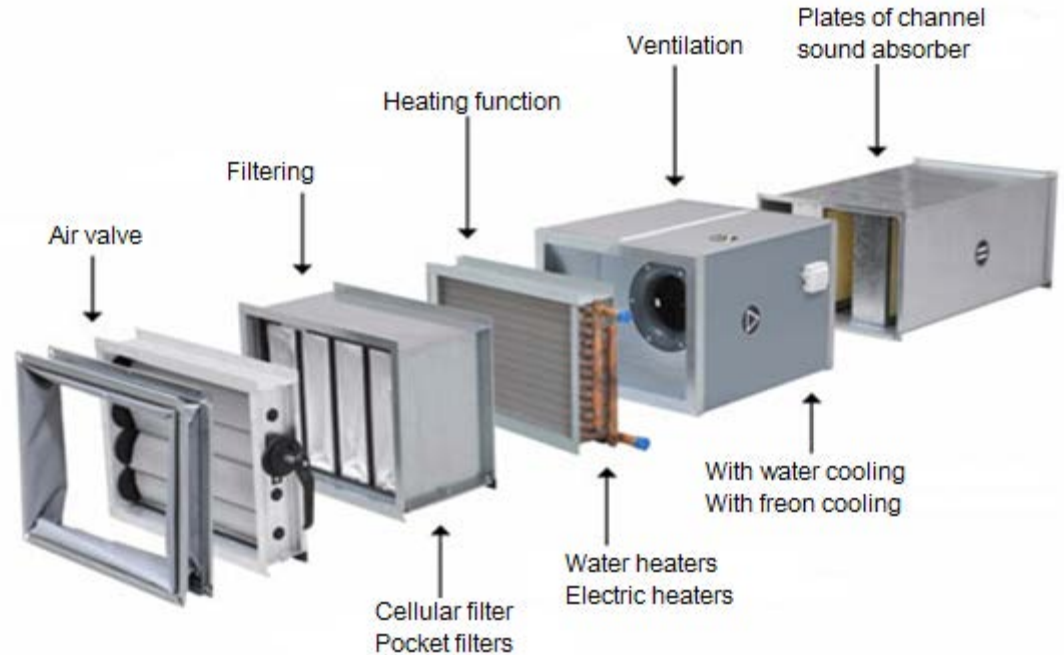


- **Ventilation**
- **Air conditioning and heating**
- **Cleaning and disinfection**

VENTILATION SYSTEM

Basic principles of ventilation devices of clean rooms:

1. The principle of displacement flow (flow from clean rooms into the less clean rooms)
2. The principle of the differential pressure (not less than 10-15 Pa)
3. The principle of a physical barrier



Objectives:

- To ensure the necessary air exchange of clean rooms
- Protection of patients, staff and the environment

We use modern energy-efficient equipment that meets European quality standards: Eurovent, ISO, TUV

Manufacturers:


(Czech Republic,
Ukraine)


(Poland)

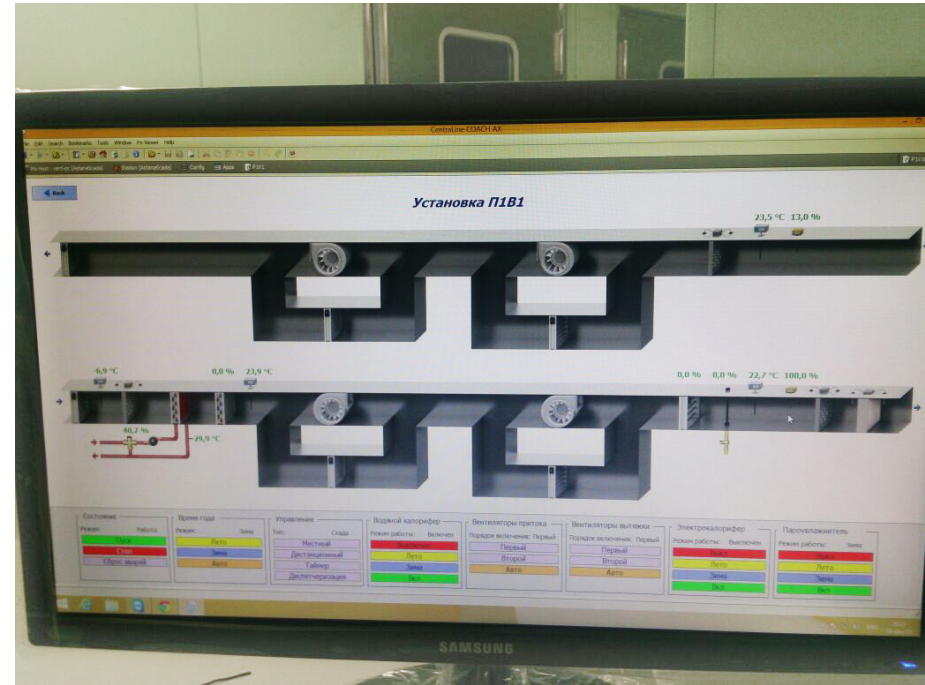


Automation and control of clean rooms

- **Online monitoring of air handling systems**
- **Video surveillance and internal communication**
- **Warning systems**
- **Microclimate control**

Visualization and control of key parameters and processes of air handling in clean rooms:

- Temperature
- Humidity
- Number of air changes
- Indication of filter replacement



Manufacturers:



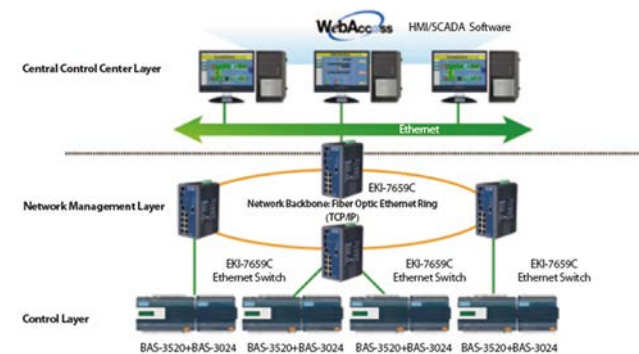
(Switzerland)



(Germany)



(USA)



Certification and validation according to international standards is an obligatory condition for effective and safe clean rooms

Qualification and validation of clean rooms:

- Quality control of the cleanroom
- Laminar flows and pressure differentials
- Testing of the integrity of HEPA filters
- Balancing of ventilation systems, installation of project costs of air and other necessary settings



Clean room Certification in MPI is carried out in **built, equipped and operated states** in accordance with the norms of SanPiN RK (Government Resolution of 17.01.2012 №87) and GOST ISO 14644-1

Independent expert
assessment is carried out by :



Private Enterprise **"Validation Center"** (GMP, GCLP)
Kharkov, Ukraine





THANK YOU FOR YOUR ATTENTION



We will be happy to answer any of your questions.

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