



LAMSYSTEMS

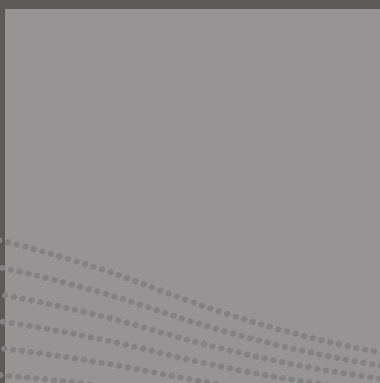
CLEAN ZONES



CUSTOMIZED
DESIGN



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BENEFITS OF CLEAN ZONES FROM LAMSYSTEMS	1
WHAT IS A CLEAN ZONE?	2
CLEAN ZONE APPLICATION.....	3
CLEAN ZONE OPERATION PRINCIPLE.....	4
CLEAN ZONES COMPOSITION.....	6
TYPES OF CLEAN ZONE DESIGN.....	7
CLEAN ZONE POTENTIAL CAPABILITIES.....	8
CLEAN ZONE CERTIFICATION.....	12
SELF-CONTAINED ACTIVE FILTER FAN UNITS.....	13
– application	
– configuration of a self-contained filter fan unit	
SPECIFICATIONS OF ACTIVEFILTER FAN UNITS.....	14
PORTFOLIO.....	15

BENEFITS OF CLEAN ZONES FROM LAMSysteMS

Following current demand, modern high-tech enterprises deliberately introduce the new cleanliness standards. Therefore, demand for LAMSysteMS air purification equipment shows consistent growth in various industries.

Based on fifteen years of experience in creating complex engineering solutions for clean rooms and clean zones, the LAMSysteMS specialists are able to design air purification equipment taking into account operating specifics of each particular enterprise.

The cost of creating a clean room system can be efficiently reduced by zoning a clean room into local areas. They can differ in cleanliness class as well as in functionality (protection of the product only or both of the product and environment). Thus, clean zones above the places with key technologic manipulations can have a higher cleanliness class than the room they are located in.

Unique patented output design of the Filter Fan Unit (FFU) ensures uniform (laminated) downward airflow across the whole area of LAMSysteMS clean zone of any dimensions. The above mentioned characteristic is crucial for clean zones of ISO class 5 and cleaner.

The microprocessor control system monitors the contamination level of the filters installed in the FFU. If necessary, it automatically increases the speed of fan revolutions and prompts an operator to replace filter.

Thanks to its design, exhaust HEPA filter can be easily replaced. The process does not require any special skills and can be performed by one person.

Modular structure with tried and tested components of the clean zones allows finding various non-standard solutions of high quality in shortest time.

Thorough detalization of tasks at the design stage, high quality of manufacturing and installation, mandatory validation of the finished products on site, qualified staff – all of it allows LAMSysteMS to receive a large number of recurring orders from the most demanding customers.

WHAT IS A CLEAN ZONE?

A CLEAN ZONE is a local spatial structure built and used in a way that minimizes the influx, emission and retention of particles inside the zone.

The clean zone is structurally made as a standalone "room in the room" product.

MAIN PURPOSE OF CLEAN ZONES:

- maintaining the specified air environment parameters in the local workspace;
- protecting the product from the environmental exposure.



The air environment parameters (air cleanliness by both microbiological and mechanical particles) maintained in the zone workspace depend on the technologic process performed in the clean zone.

- A clean zone can be used in both a clean room and an ordinary room.
- Due to its compactness, a clean zone can be installed in almost any premises.
- In the level of air cleanliness, the clean zones correspond to clean rooms, but are much more cost-effective.
- The clean zones are mobile. They can be used where it is necessary at the moment (prefabricated module constructions).

Clean zones application is wide and nowadays covers many spheres of technology, human life and activity:

- Pharmaceutical production
- Medical equipment production
- Perfume and cosmetics production
- Food production
- Biotechnology and nanotechnology
- Electronics
- Semiconductors production
- Micromechanics
- Precision instruments industry and mechanics
- Production of high class optical elements
- Space and aircraft industry
- Precision products production and others



Clean zones in photo-lithography

Cleanliness class 5 ISO 14644-1

Assembly overall dimensions (LxWxH, mm) 1300x1300x1995



A clean zone for probing in a pharmaceutical enterprise

Cleanliness class 5 ISO 14644-1 or class A GMP

Assembly overall dimensions (LxWxH, mm) 1300x1300x2420
(material is stainless steel)

CLEAN ZONE OPERATION PRINCIPLE

The clean zone providing cleanliness class 5 of ISO 14644-1 or class A GMP has a ceiling made of a full set of Filter Fan Units (FFU) taking air out of the zone room.

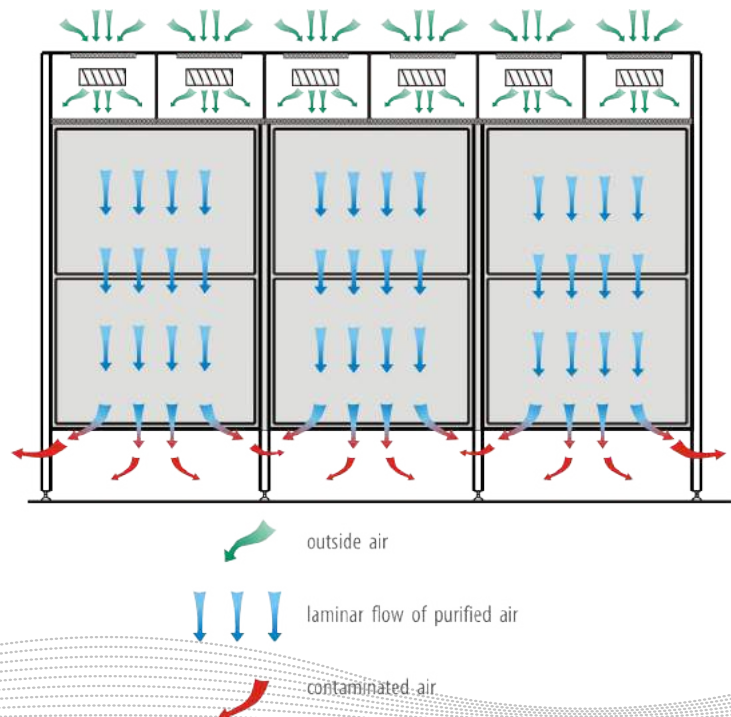
Cleanliness inside the zone workspace is provided by extruding the contamination by a unidirectional purified airflow (air piston effect).

Walling is fixed along the ceiling perimeter and can be made of:

- transparent tempered glass
- sealed metal panels with special surface coating resistant to disinfectants and ultraviolet irradiation exposure
- stainless steel sealed panels
- flexible walling

In cleanliness class 5 clean zones the walling does not reach the floor to allow free air passage inside the zone without its thickening. Thus, the quality characteristics of the laminar flow are enhancing.

All joints are sealed with a polyurethane sealant for clean rooms.



AIRFLOW SCHEME IN ISO CLASS 5 CLEAN ZONES

A clean zone of ISO cleanliness class 7 as per ISO 14644-1 and lower, or of GMP class C(D), has only several FFUs taking the air out of the room.

The number of FFUs is determined on the basis of the required air exchange multiplicity inside the zone taking into account its geometric dimensions.

Air is supplied by a weak turbulent flow, and the air environment cleanliness is achieved by dilution, concentration reduction and aerosol particles removal.

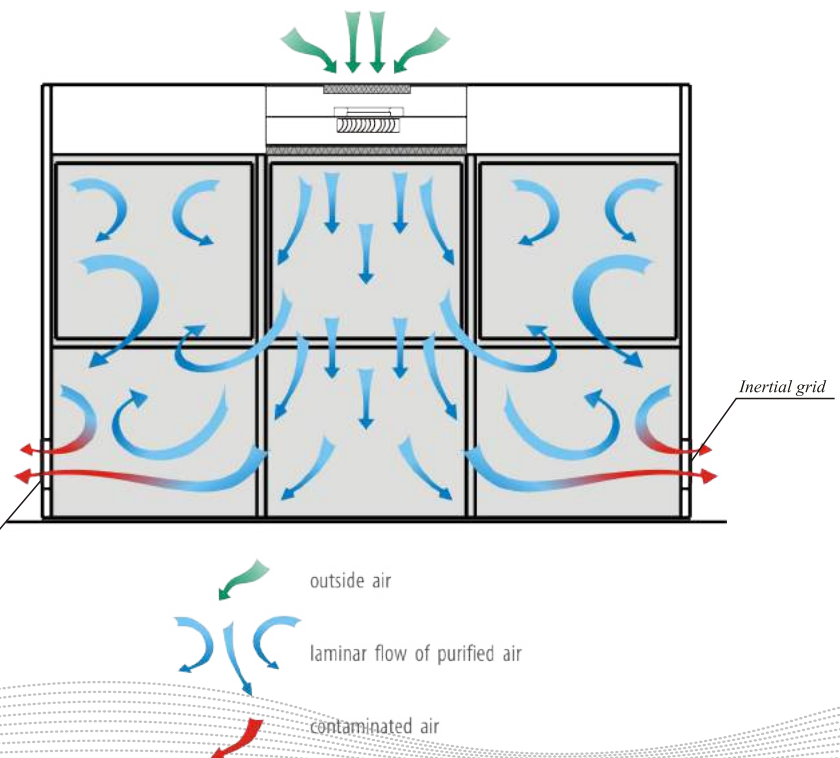
In such an approach, the zone ceiling is formed on a raster principle, filter fan units and lamps are put in their cells.

The rest of the area is closed by ceiling sandwich panels with the metal facing the clean zone.

The product working zone is formed by the enclosing structures fixed in the frame along the product perimeter. The enclosure reaches the floor and is made of transparent tempered glass or sealed metal panels with a special surface coating resistant to disinfectants and UV radiation.

To provide the overpressure inside the zone, inertial grids or diffusers are installed in the walling.

All joints are sealed with a polyurethane sealant for clean rooms.



AIRFLOW SCHEME IN ISO CLASS 7(8) CLEAN ZONES

CLEAN ZONE COMPOSITION

CLEAN ZONE COMPOSITION:

- FILTER FAN UNIT (FFU)
- WALLING OR GUIDE MEMBERS
- BEARING FRAME WITH SUPPORTS
- CONTROL SYSTEM
- ILLUMINATION SYSTEM
- ULTRAVIOLET TREATMENT SYSTEM (IF NECESSARY)

Clean zones can have the necessary number of doors for the operator's entrance and for transportation of some products or equipment that operator works with.

If necessary, all clean zones made by LAMSYSTEMS regardless of the cleanliness class can be equipped with air locks, pass windows and anterooms for the personnel to change into special clean room clothing.



A clean zone for pharmaceutical laboratory
Cleanliness class 5 ISO 14644-1 or class A GMP
Assembly overall dimensions (LxWxH, mm) 1905x1605x2580



A clean zone for an extruder loading station while manufacturing a high voltage cable
Cleanliness class 7 ISO 14644-1
Assembly overall dimensions (LxWxH, mm) 10200x4200x3800

TYPES OF CLEAN ZONE DESIGN

The zone cleanliness class is defined in accordance with classification of air cleanliness as per ISO 14644-1 or GMP.

Structurally, clean zones can be made either as a part of the clean room ventilation system or as a stand-alone product.

The first method is used when the clean zones location is defined while designing a clean room and is not to be changed for the entire period of its operation, as well as if it is necessary to supply the conditioned air into the clean zone workspace.

The second method involves the possibility of changing the location of clean zones which gives more opportunities to change the technological process and modernize the equipment. In this case clean zones made as a stand-alone product can be either fixed to the load-bearing structures of the clean room or be mobile stand-alone products, with the ability to move within the clean room.

STATIONARY CLEAN ZONE

Clean zones can be made in the stationary version when their structures are rigidly fixed to the floor, walls, ceiling or other bearing structures of the room.



A clean zone for the production of special cleanliness materials

Cleanliness class 5 ISO 14644-1 or class A GMP

Assembly overall dimensions (LxWxH, mm) 7480x3815x3190

MOBILE CLEAN ZONE

The clean zones can be produced in a mobile version when they are necessary to be relocated. Most often these are cleanliness class 5(6) zones.



A clean zone for operation with optical products

Cleanliness class 5 ISO 14644-1

Assembly overall dimensions (LxWxH, mm) 1300x2600x2515

CLEAN ZONE POTENTIAL CAPABILITIES

The clean zone operates on the principle of air circulation in the room where it is installed. Thus, the clean zone not only creates air environment of the guaranteed cleanliness class in it but also effectively cleans the air in the room. Often in such cases additional engineering systems are not required for maintaining the room cleanliness class.



A Clean zone for a biological research laboratory

Cleanliness class 5 ISO 14644-1 or class A GMP

Assembly overall dimensions (LxWxH, mm) 4300x1600x2577

Under certain conditions, the clean zone can be modernized to a clean room with a microclimate inside the zone. For this purpose it is necessary to equip it with an air system supplying conditioned outdoor (street) air.

The process equipment can be integrated into a clean zone completely (picture 1) or partially (picture 2, picture 3).



**A clean zone above the filling line
in pharmaceutical production**

Cleanliness class 5 ISO 14644-1 or class A GMP Assembly
overall dimensions (LxWxH, mm) 3105x3105x2420



**A loading door of a freeze-drying is integrated
into the clean zone**

Cleanliness class 5 ISO 14644-1 or class A GMP
Assembly overall dimensions (LxWxH, mm) 3105x3105x2420



**A dry heat sterilizer is integrated
into the clean zone**

Cleanliness class 5 ISO 14644-1 or class A GMP
Assembly overall dimensions (LxWxH, mm) 3105x3105x2420



To create workplaces of a higher cleanliness class, laminar hoods and fume hoods can be set in clean zones.



A fume hood in the clean zone
Cleanliness class 7 ISO 14644-1
Assembly overall dimensions (LxWxH, mm): 4910x4310x2515



A clean zone for control of special cleanliness materials
Cleanliness class 5 ISO 14644-1 or class A GMP
Assembly overall dimensions (LxWxH, mm): 7480x3815x3190



A clean zone for medical equipment assembly

Cleanliness class 5 ISO 14644-1 or class B GMP

Assembly overall dimensions (LxWxH, mm) 8500x4300x2915



A clean zone for assembly of optical instruments

Cleanliness class 5 ISO 14644-1 or class A GMP

Assembly overall dimensions (LxWxH, mm) 2505x1305x2415



A clean zone with an anteroom of clouded glass installed in a non-category room

Cleanliness class 7 ISO 14644-1

Assembly overall dimensions (LxWxH, mm) 4943x4305x3515

CLEAN ZONE CERTIFICATION

Being installed at the Customer's premises, all clean zones manufactured by LAMSysteMS are to be certified according to ISO 14644-1/ISO 14644-3.

The certification of clean zones is carried out in the presence of the Customer's representative by specialists of LAMSysteMS who have been trained and qualified and have experience in clean rooms and clean zones certification in electronics and pharmaceutical industries.

The purpose of certification is:

1. Testing the proper clean zone performance and functioning in accordance with operational documents.
2. Testing the integrity of HEPA filters installed in the clean zone and their sealing places.
3. Testing the clean zone performance on fresh air and the ventilation rate.
4. Testing the stated cleanliness class in the working zone of a product.

For conducting certification, the professionals of LAMSysteMS have all necessary measuring instruments and equipment.

According to the tests and inspections results, reports and qualification protocols of acceptance tests are made. These documents shall be included by the Customer into the enterprise production certification documentation, and they can also be used to develop corrective measures if the characteristics of the process equipment installed in the clean zone do not meet the cleanliness requirements.

The final stage of this work is training and consulting the maintenance personnel of the Customer to operate the clean zone properly.



SELF-CONTAINED ACTIVE FILTER FAN UNITS

AN ACTIVE FILTER FAN UNIT IS DESIGNED FOR
EFFICIENT CLEANING OF THE AIR FROM AEROSOL CONTAMINATION



A touchscreen ensures control of the filter fan unit (up to 16 filter fan units can be connected to and displayed on a single control screen).



934.120.10

934.120.11

APPLICATION:

The filter fan unit ensures a higher cleanliness class in a room of installation by recirculation and highly efficient filtration of the air.

A filter module equipped with a laminarization screen creates uniform laminar airflow and can be mounted over the critical areas that require high level of air cleanliness to be maintained.

A filter module equipped with airflow baffles* creates even distribution of the clean air across the whole room. The filter modules can be grouped to form laminar flow fields.

CONFIGURATION OF A SELF-CONTAINED FILTER FAN UNIT:

1. Two fans with EC-motors (electronically commutated motor).
2. Preliminary filter G4.
3. Fine HEPA filter H14.
4. Automatic control system ensuring the maintenance of constant airflow velocity, switching on and off of filter fan and its lighting*, control of the operation mode indicators and commutation with external computer or touchscreen (for 934.120.10 and 934.120.11).
5. Light indicators showing operation modes of the filter module and alarm situations (filter clogging).
6. Aerosol inlets and air sampling outlets for HEPA filter integrity testing.
7. Laminarization screen made of polymer mesh or airflow baffles*.
8. Universal fixing brackets for ceiling mounting and attaching the filter fan units one to another.

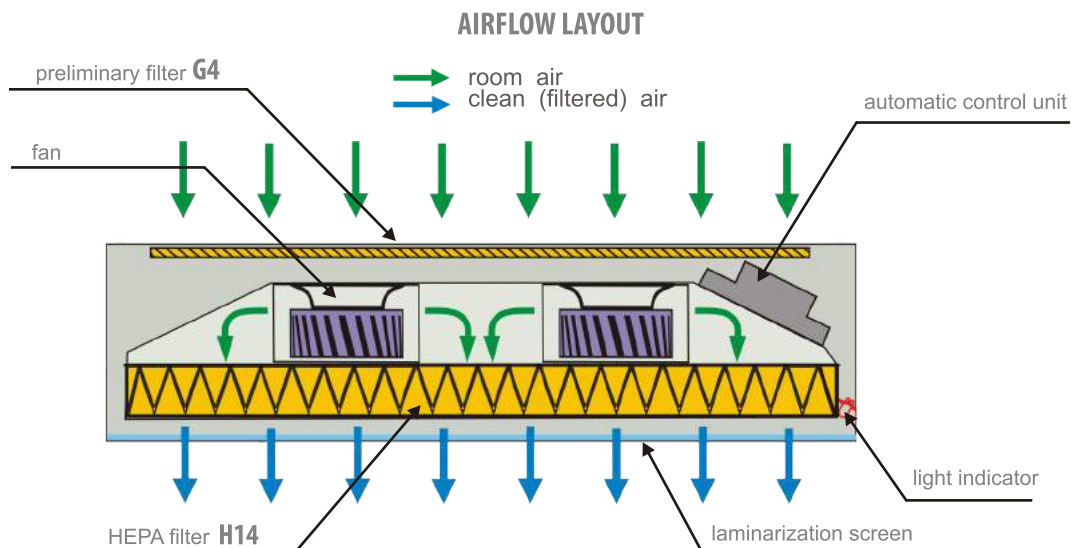
* ADDITIONAL OPTIONS:

- LED lighting (only for filter fan units with laminarization screen).
- Airflow baffles.

SPECIFICATIONS OF ACTIVE FILTER FAN UNITS

	Articles:	934.120.00	934.120.01	934.120.10	934.120.11
	Configurations:	Frame made of powder-coated steel	Frame made of stainless steel	Frame made of powder-coated steel	Frame made of stainless steel
SPECIFICATIONS:					FOR WORK WITH EXTERNAL CONTROL PANEL
Dimensions with fixing bracket / without fixing bracket (WxDxH), mm		1200 x 600 x 465 / 1200 x 600 x 315			
Maximum weight, kg		38			
Clean air capacity at preset 0.45 mps average airflow velocity, m³/h		1150 - 1175			
Maximum input power, W		340			
Maximum input power with LED lighting*, W		380			
Lighting*:					
– number of LED lighting sets, pcs.		1			
– power of a LED lighting set, W		39			
Preset average outflow velocity of the filter fan unit, m/s		0,45			
Class of preliminary filter as per EN 779		G4			
Class of HEPA filter as per EN 1822-1		H14			
Air input		100% from the room of installation			
Time of continuous operation		unlimited			

* LED lighting is an additional option, not part of the standard delivery set



PORTFOLIO









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The manufacturer reserves the right to change specifications and designs in further technical development of the equipment