

LAMSYSTEMS

SAVVY

MICROBIOLOGICAL SAFETY CABINETS Class II Type A2



SAVING

PROTECTION

DESIGN

OPERATING

CLEANING

TESTING

It is SAVVY, quite savvy

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ENERGY SAVING EC FANS



The microbiological safety cabinets class II SAVVY use radial, energy-efficient and noise-free EC fans, which allow cutting down the operation costs significantly and reducing levels of acoustic noise and vibration, resulting in comfortable operating conditions.

KEY BENEFITS OF USING THE EC FANS:

- Monitoring and fine adjustment of operating modes with the microprocessor control system
- Low energy consumption
- Low heat emission
- Low noise level
- No vibration
- Longer operating life

POWER CONSUMPTION OF THE CABINET **0.112 KW**

COMPARISON



	Power capacity kW	Power consumption per year kWh ^[2]	CO ₂ emissions t/year ^[3]	SAVING	CO ₂ REDUCTION
SAVVY	0,112 ^[1]	233,0	0,117	33%	33%
Alternative*	0,160**	332,8	0,166		

* A model of equipment with analogous technical characteristics by a known manufacturer was taken for comparison

** Information is taken from the official advertising materials of the manufacturer

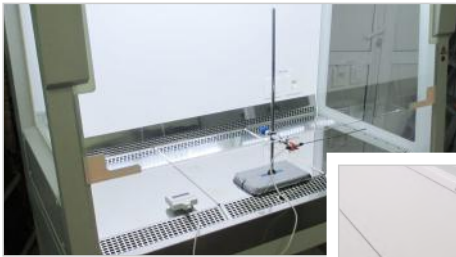


- [1] – The measurements are taken under the operating mode - the fan motor is on, the light in the working chamber is on, the load on the built-in outlets unit is excluded
- [2] – 8 hours per day, 5 days, 52 weeks
- [3] – Each kWh of produced energy accounts for 0.5 kg of CO₂ emission (source: http://www.carbonindependent.org/sources_home_energy.htm)

LOW ENERGY CONSUMPTION GIVES LOW LEVEL OF HEAT EMISSION, WHICH DECREASES NECESSITY IN ROOM AIR CONDITIONING AND, THEREFORE, THE COSTS OF IT.

HEAT EMISSION READING&CALCULATIONS

Microbiological safety cabinets are the source of heat emissions, high level of which may cause increase in room temperature and decrease of air humidity at the workstations, leading to operator's discomfort, decrease in efficiency, tiredness, skin irritation and itchiness. Main heat emitting elements in the microbiological safety cabinet are the fan, the fluorescent lamp, and a front panel where convective heat abstraction into environment takes place.



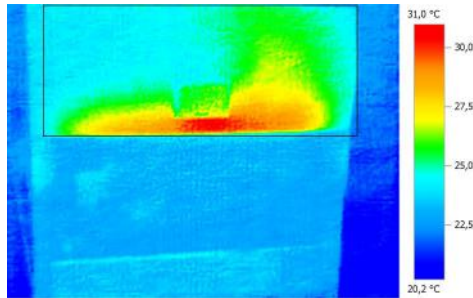
Temperature measurements of inward airflow



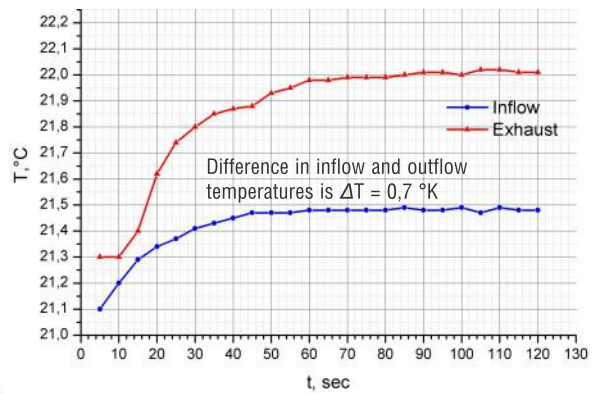
Temperature measurements of outward airflow



Measurement of the heated area on the front panel



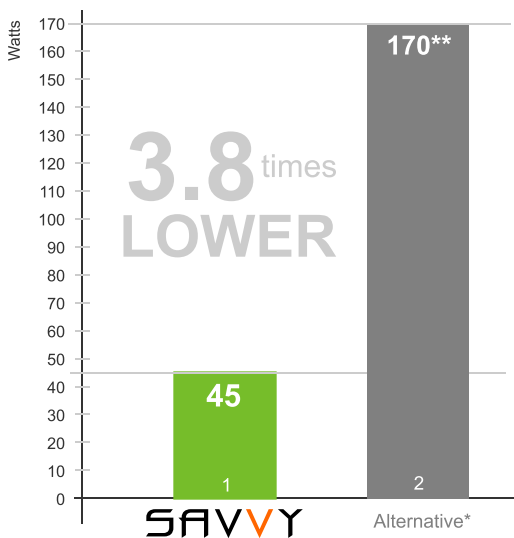
Graph: Recording of airflow temperature.



REAL HEAT EMISSION BY THE CABINET:






- with fan and light on **45W**
- with fan on and light off **25 W**
- with light on and fan off **20 W**

COMPARISON



* A model of equipment with analogous technical characteristics by the known manufacturer was taken for comparison

** Information is taken from the official advertising materials of the manufacturer

-  Desktop laser printer when printing **215 W**
-  Working person **180 W**
-  Resting person **100 W**
-  Switched on monitor (19") **80 W**
-  **SAVVY**
IN THE OPERATING MODE* **45 W**

* the fan motors are on, the light in the working chamber is on, the load on the built-in outlets unit is excluded



MICROPROCESSOR CONTROL SYSTEM



The cabinet is provided with a microprocessor control system which immediately informs the operator about reducing protective properties of the cabinet showing an alarm message on the display and activating the audible-visible system.

The fan motor control system **Sintel-1** allows to minimize the power consumption of the cabinet, to reduce the level of acoustic and electromagnetic noise.

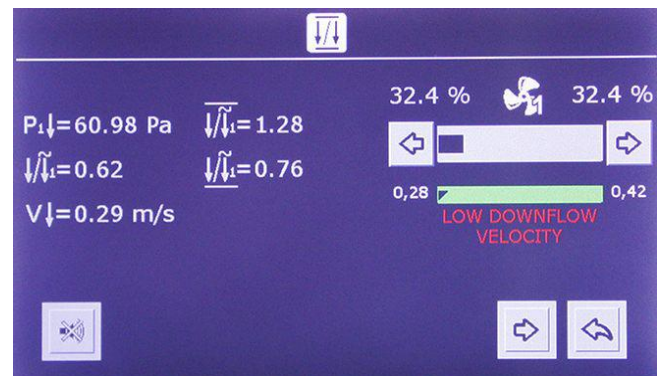
The system of air consumption static regulation **AIS LS** automatically regulates air balance in the working chamber changing the number of fan revolutions according to the level of filter contamination. Reaching the threshold value of contamination, the system activates the warning system.

HIGH MAINTENANCE ACCURACY OF PRESET AIRFLOW VELOCITY at any level of filter clogging and in changing ambient conditions (humidity, temperature, pressure).

The system of monitoring the cabinet working modes and the audible-visible indication warns about the air flow imbalance in the working chamber.

THE DISPLAY SHOWS THE FOLLOWING ALARM MESSAGES:

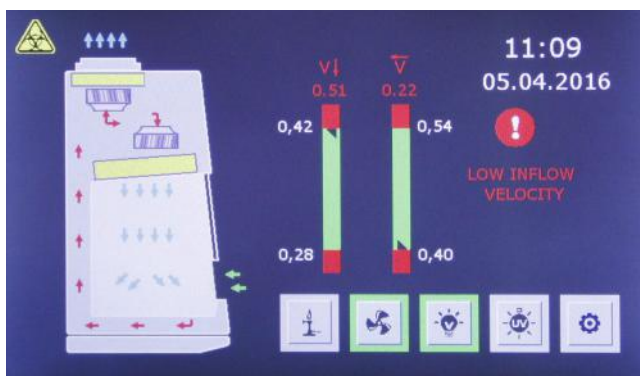
- LAMINAR FLOW FAILURE!**
- UV UNIT IS NOT SET ON PLACE!**
- OPENED FRONT SASH!**
- LOW INFLOW VELOCITY!**
- LOW DOWNFLOW VELOCITY!**
- HIGH DOWNFLOW VELOCITY!**



The unambiguity of these messages hides multifunctioning of the operational system for indicating malfunctions and analyzing causes of their appearance.

AUDIBLE-VISIBLE INDICATION

Alarm indication is switched on automatically when the air flow parameters are deviated from the specified. For a period of warming up and preparing the cabinet for the main operation mode, the audio indication can be switched off manually.



UNAUTHORIZED ACCESS PROTECTION



The automatic blocking of control panel excludes the access of unauthorized personnel to the cabinet control. It is only possible to unlock the panel with a personal password.

HIGH-PRECISION SENSORS

Fig. 1 and 2: Position of the moving and removable parts that effect the protective capacity of the cabinet is controlled by high-precision optical sensors.



1. The front sash position sensor can detect even a gap of 5 mm.



2. The UV unit position sensor immediately turns off the UV lamp at the attempt of opening the working UV unit, thus, preventing accidental personnel irradiation.

3. Pressure sensors in the construction of the LAMSYSTEMS cabinets have obvious advantages in comparison with the hot-wire sensors usually used in the cabinets of such types. Pressure sensors are resistant to dust, humidity, and temperature changes. They keep indicated parameters precise during the whole period of exploitation without additional periodical adjustment. Calibration of the microprocessor control system is done only once during the manufacturing process by the special technique using the calibrator and the unique software. Any, even minor, changes in velocity, direction or balance of the airflows causing drop in cabinet's safety will be registered by the pressure sensors and will automatically trigger an audible alarm.



LOW NOISE LEVEL 47 dBA

Noise level measured when HEPA filters are newly installed and uncontaminated in a considerably free sound field over the sound reflecting surface (noise level in real-time operating conditions depends on the room size, the cabinet placement, and the background noise level and it can change in the range of 3-4 dB(A)).

TOUCH SCREEN

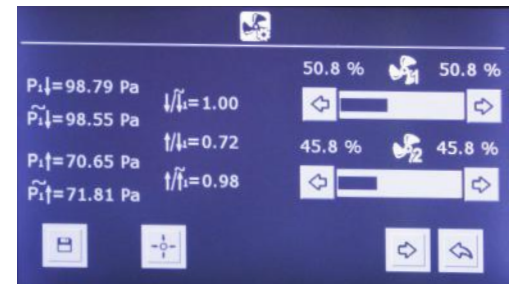
made displaying modes more demonstrative, the cabinet control easier and provided the user with more service information.

Suited for wet cleaning with disinfectants.
Allows work in gloves.



EASY AND CONVENIENT AIRFLOW VELOCITY SETTING

The system provides separate inflow and downflow control as well as automatic air balance control. There is no need to adjust air balance mechanically which significantly decreases maintenance time when validating, changing filters and performing periodic verifications.



HYDRAULIC DAMPERS

The cabinet is equipped with hydraulic dampers for smooth closing the front sash and pullout UV unit eliminating the possibility of its break and providing easy operation.



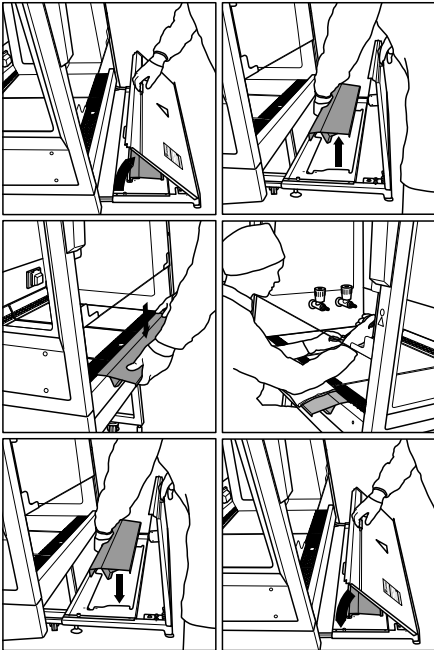
FRONT SASH CORNERS MARKING

Coloured marking of the front sash corners in the open position serves as warning and helps to prevent accidental injuries of the personnel.

EXTENDED BASIC CONFIGURATION

unique UV unit, optical sensors of the UV unit and front glass position, UV-unit and front glass dampers, sockets in the working chamber, LED lights, removable armrest, frame with a footrest.

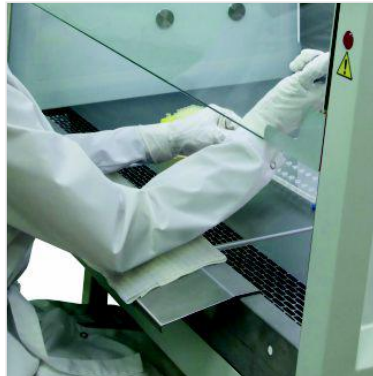
ARM SUPPORT



The movable arm support provides a reliable rest for operator's elbows; it prevents from keeping his arms hanging at all times and creates additional comfort at work.



- Protects the front table grille from accidental covering;
- Suitable for thorough disinfection and autoclave sterilization;
- Stored in a special compartment of the pullout UV unit



LAMSYSTEMS CLEANING SAVVY

The cabinet design allows an easy access to all surfaces that come in contact with pathogenic agents and microorganisms and their disinfection. The arm support and each segment of the movable table top can be sterilized in an autoclave. The corners of the tray are rounded for more convenient and better treatment.

SUITABILITY FOR CLEANING AND DISINFECTION



The sash lifting design was made in accordance with EN 12469:2000. One of the standard requirements to the cabinet design is easy access to all working surfaces for cleaning and disinfection.



CABINET MATERIALS

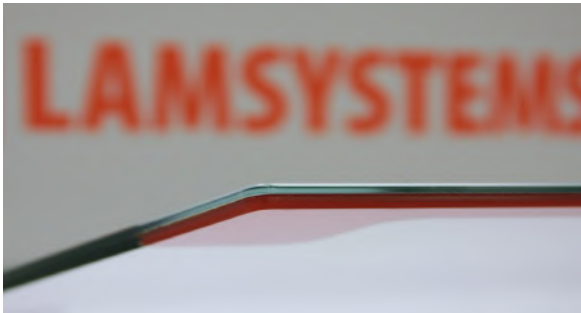
Housing – powder coated metal, corrosion-resistant, non-flammable, non-absorbing. Table top – stainless steel. Windows – laminated glass (front), tempered glass (side). All materials are resistant to cleaning agents and disinfectants as well as formaldehyde treatment.

IMPORTANT! When using chlorine compounds, remember of their corrosive property including the effect on stainless steel.



FRONT SASH – LAMINATED GLASS

The laminated glass (triplex) consists of two layers of glass and a polymer film. Because of this, when broken, triplex doesn't form sharp injury-causing fragments, but only gets cracked keeping its form. The front sash damage causes neither disturbance of the air flows, nor reducing protective properties of the cabinet.



PULLOUT UV UNIT

UV light is located in the pullout unit outside the work chamber and does not interfere with the airflow at work.

The cabinet has a pullout UV unit which is placed at the bottom of the cabinet (outside contamination zone) and only used when it is necessary to make disinfection of the working chamber.

UV can effectively 'kill' (deactivate or destroy) microorganisms. To destroy the microorganisms, UV rays penetrate the cell's membrane destroying the DNA and, so, stop its ability to reproduce and multiply.



The UV irradiation system can be considered an additional method of the cabinet sanitation.

The design of easy-to-access UV unit helps an operator to reduce the preparation time for UV disinfection.

EASY AND SAFE FILTER CHANGING

thanks to the layout solution and a new pressure system minimizing the risk of filter damage during their installation.

PANEL FINE FILTERS



Each HEPA filter is tested and packed in conformity with American standard IEST-RP-CC-001.3 (HEPA and ULPA) or European standard EN 1882.

The filter efficiency is tested by an aerosol test on a special stand by scanning the clean side of the filter and counting infiltrated particles.

The cabinet is equipped with a HEPA filter providing air purification efficiency of 99.995% for 0.3 µm particles.

The HEPA filter is placed at the entrance to the working chamber at the angle of 7° to the horizontal and thus at the right angle to the front sash. Such position considerably improves the air flow in the chamber.

The filter is fixed with springs ensuring leak-tight seal of the filter for the entire lifetime.

The microprocessor control system monitors the degree of the filter contamination each time the cabinet is switched on, and if the critical level is reached (≈ 90%), it shows the information on the touchscreen display.

ADDITIONAL OPTIONS



- ULPA filters
- A hood to connect the cabinet to an external exhaust system
- Extra sockets
- Technical gas tap with electromagnetic valve*
- Inflammable gas tap with electromagnetic valve*
- Vacuum tap with an electromagnetic valve*

* The electromagnetic valve automatically closes gas and vacuum supply when the power is down or the cabinet is turned off.

A gas tap and a vacuum tap can be installed in a functional cabinet without any additional validation.



THE ACCEPTANCE TESTING AREA



is made on the “clean room” basis and provided with certified equipment to carry out necessary testing of all commercial products.

Acceptance test SAVVY consists of 23 obligatory checks whose results are formally reported. A test report copy can be enclosed to the manual upon request of the customer.



AUDIBLE-VISIBLE INDICATION ADJUSTMENT

Alarm thresholds are adjusted for:
downward and inward air flow velocity deviations;
front sash open in the Operation mode;
UV unit pulled out in the Storage mode.



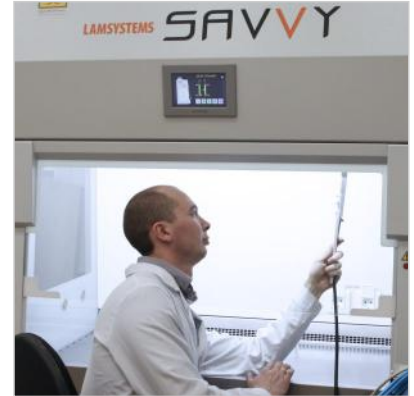
HOUSING LEAK TIGHTNESS

Checked by creating internal pressure after sealing all openings and by carrying out a soap bubble test for all joints, junctions and gaskets.



INWARD AND DOWNWARD AIR FLOW PARAMETERS

After appropriate adjustment, the following velocity is set up: for inward air flow through the front opening – 0.47m/s*, for downward air flow in the working chamber – 0.35 m/s.** in accordance with EN 12469:2000



HEPA FILTER INTEGRITY CHECKING

The supply and exhaust filters and their sealing are checked.



NOISE

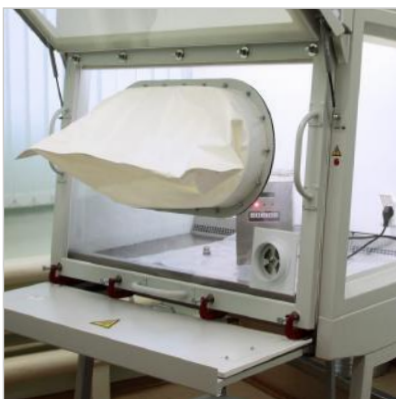
The noise level meets the requirements of EN 12469:2000 standard.



ILLUMINATION Illumination corresponds to the conditions of safe operation in the cabinet working zone. The working surface illuminance is 2,000 lux while recommended one is 750 lux.

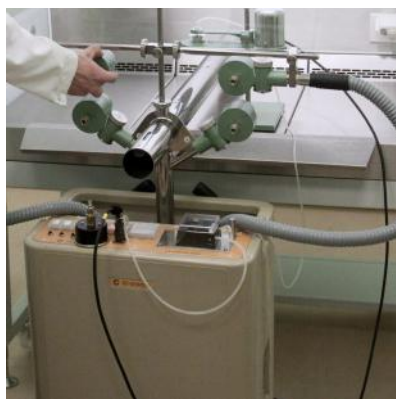


VIBRATION The vibration mean-square displacement value in the table top centre of the operating cabinet does not exceed 0.005 mm (frequency range of 20–20000 Hz).



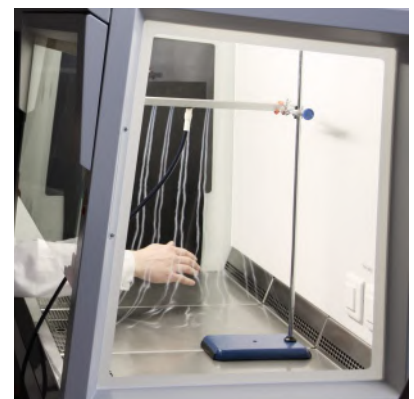
FORMALDEHYDE AND AMMONIA TREATMENT

(FUMIGATION)The cabinet is well adapted to fumigation. A simplified method of formaldehyde disinfection is described in detail in the user manual.



POTASSIUM IODIDE TEST

Tests for pathogenic agents retention efficiency in the front opening.



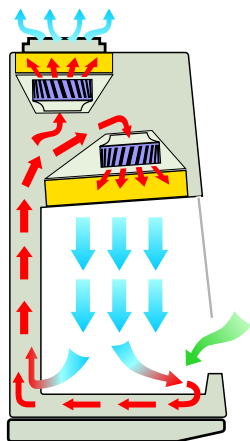
AIR FLOW VISUALIZATION

Shows the proper distribution and directions of air flow at different points of the working chamber and throughout the front working opening.

Video "Air flow visualization"

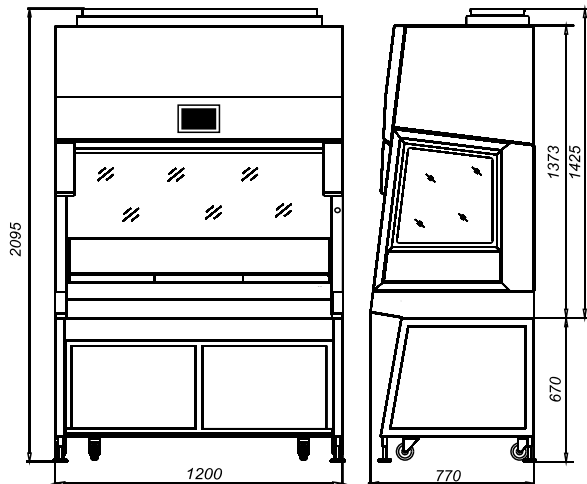


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AIR FLOW SCHEME

- contaminated air
- room air
- clean (filtered) air



MAIN CHARACTERISTICS

Air cleanliness class in the working chamber of the cabinet in terms of concentration of airborne particles (aerosols) according to ISO 14644-1, not less than ISO 5

Cabinet class according to EN 12469, NSF/ANSI 49 II

Cabinet type according to NSF/ANSI 49 A2

Average downflow velocity in the working chamber, m/s 0,35±0,01

Average velocity of the inflow through the work opening, m/s 0,47±0,03

Cabinet's power supply parameters:

- voltage, V~ 220-240
- frequency, Hz 50

Air recirculation rate in the cabinet, % ≈70

Class of the installed HEPA-filters according to EN 1822-1 H14

MAIN PARAMETERS AND DIMENSIONS

	900	1200	1500	1800
Article	1E-B.002-09.0	1E-B.002-12.0	1E-B.002-15.0	1E-B.002-18.0
Dimensions of the cabinet assembled with the stand (WxDxH), mm.....	1000x770x2095...	1200x770x2095...	1500x770x2095...	1800x770x2095
Dimensions of the working chamber (WxDxH), mm.....	905x610x750.....	1105x610x750.....	1405x610x750.....	1705x610x750
Clean air inflow volume, m ³ /h.....	656-674.....	795-817.....	1008-1036.....	1210-1245
Air outflow volume, m ³ /h.....	273-309.....	333-378.....	426-484.....	510-580
Maximum power consumption (without the built-in outlets load), W, not more than.....	110*.....	112*.....	142*.....	220*
Total acceptable load on the built-in outlets, W, not more than.....	1000.....	1000.....	1000.....	1000
The illuminance level in the working zone (integral value defined over the whole area of the working zone), lux, not less than.....	2000.....	2000.....	2000.....	2000
Noise level at 1m distance from the cabinet, dBA, not more than.....	47**.....	47**.....	53**.....	55**

* power consumption in the operating mode (fans and lighting turned on) with newly installed unclogged HEPA filters

** noise level measured when HEPA filters are newly installed and uncontaminated in a considerably free sound field over the sound reflecting surface (noise level in real-time operating conditions depends on the room size, the cabinet placement, and the background noise level and it can change in the range of 3-4 dB(A)).



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