DATASHEET

SAFEMATE ECO+ SERIES
MICROBIOLOGICAL SAFETY CABINETS

- Low energy consumption DC motor blower
- State of the art microprocessor control system.
- Large digital display, high resolution
- Air and aerosol-tight sliding sash, electrically operated by finger touch
- Alarms for low air flow and wrong front window position
- Sloped front and back wall for the most comfortable access
- Lateral windows
- Front access for filter maintenance and service
- C-shaped support stand for the easiest *one-man installation* procedure
- Easy retrofit option kits

Safemate ECO+ Cabinets are supplied in four different sizes (0.9, 1.2, 1.5 and 1.8).

BioAir S.p.A. - Tel.: +39 0382 6672.1
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Numero REA: MI-2577880
Partita IVA e Codice Fiscale: 11078210967
Cap. Soc. Euro 3.000.000 i.v.
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These last generation Microbiological Safety Cabinets Class II type A2, have been certified according to the most stringent safety standards (EN12469-2000).
The internal design, the air flow aerodynamics and monitoring, the built-in safety devices and the very accurate manufacturing, guarantees the highest performances at the most stringent safety levels, as specified by EN12469 standard and have been certified by the most prestigious European certification bodies for Safety Cabinets.
Certified intrinsic biological safety, combined with impressively competitive prices, gives the end user a state-of-the-art cabinet accessible to every budget, that only experienced European design and accurate quality manufacturing, can provide.

The ECO+ series evolves from our best seller series with a more eco-friendly approach: the new DC Motorblowers provide high efficiency while consuming less energy and the airflows has been designed in order to reduce noise pollution, while assuring the high level of operator, product and environment protection required by the EN12469-2000 standards.

Main specifications

- Microprocessor controlled DC motor blower, with volumetric sensor for exhausted air flow monitoring
- State of the art Microprocessor control system offering:
  - Large screen monitor.
  - Automatic control of preset airflow volumes.
  - Sliding sash window with smart control.
  - Permanent monitoring of HEPA filters life span.
  - Alarms. Multilevel alarms, with redundancy functions.
  - Permanent display of working conditions.
  - Highest air flow stability both in case of transitional disturbances or to progressive filter clogging
  - Continuous monitoring of front barrier air flow for the highest operator safety
  - Low barrier alarm
  - Power failure alarm
- Volt-free contact for remote monitoring of exhaust fan.
- Automatic reset of initial conditions in case of power failure
- C-shaped support stand for the easiest *one-man installation* procedure

Mechanical and functional specifications

- 5° Sloped front design for the highest operational comfort. Sloped back side of the working chamber for the best down flow distribution
- Utilities inlets from the top of the cabinet.

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- Stainless Steel internal surfaces with SB finishing (including spillage tray). Solid or perforated work surface (30cm sectors) and special designed front grill in stainless steel (AISI304 or AISI316)
- Electrically operated sliding multilayer safety glass window
- Comfortable 20cm front opening
- Easy to install retrofit options.
- Comfortable lateral side windows
- Exposed exhaust HEPA filter for easy visual integrity check.
- H14 class High Efficiency Particulate Air filters with 99.999% efficiency on .3micron particles (most penetrating particle diameter) (Efficiency >= 99.995% on 0.1-0.2 micron particles MPPS as per EN1822-1)
- ISO 3 (ISO14644-1) internal cleanliness level
- Both exhaust and Main Filters are equipped with a micromesh membrane located downstream which acts as airspeed equalizer expansion plenum, as well as a clear indicator of filter damages.
- Filter change and maintenance from the front of the cabinet.
- Exhaust transitions easily installable.
- Key operated. The key can be removed when the unit is in SAFE mode, in order to avoid unwanted operation. In case of power failure, the cabinet is re-set to original working conditions.
- Self-calibration cycle performed when cabinet is switched on.
- High speed rinse and set up cycle performed, before reaching the SAFE operating mode.
- Visual display of SAFE conditions. Pre-warning before actual alarm conditions are reached (visual and acoustic alarms)
- Soft touch control with keys for standard service utilities. Interconnected UV and LED lights.
- Exhaust and recirculating flow rates ensure 25 air changes/min in the working area (30%/70% split)
- Front barrier air speed ≥ 0.5mt/sec
- Aperture protection Factor (Apf) ≥ 1.5×10^5
- Max power (for all power point) 3Amps.
- Microprocessor equipped with analogical watchdog.
- *BS version with dual exhaust HEPA filter (second filter is inside the main unit, both exhaust filters are DOP testable)*
- *Class I version available on request*

ADVANCED FEATURES

- Active front window belts tension control system. This mechanism interrupts the unrolling of the suspension belts supporting the front window in case of a jam or of the presence of obstacles to the window movements. This avoids the risks of the glass falling suddenly and reduces the risk of pinching during the window's movement.

- ECO Mode: this operational mode allows the reduction of power consumption and noise level while keeping the inner working area sterile. When engaged the front sash will be lowered to a few centimeters from the working surface and the motorblower will slow down. The reduced opening will allow the lower airflow to keep the front barrier active. Working is not allowed when in ECO Mode.

CONTROL PANEL

Controls are located in the front part of the cabinet and include the control keyboard and LCD display.

The microprocessor will take care of regulating the motorblower to keep the airflows at the calibrated setpoints, based on the feedback data received from the vane anemometer installed in the exhaust path of the cabinet.

Access control is provided with a key for ON/OFF switching for users and a numeric password to access calibration and service menus.

The following parameters are monitored:

- Laminar vertical flow speed;
- Front barrier inflow speed;
- Audible/visual alarms for insufficient airflows, blower malfunction, front window position;
- UV exposure remaining time;
- Hour counters for: cabinet, HEPA filters, UV lamp.

The following controls are available:

- Cabinet ON/OFF switch;
- White light ON/OFF;
- Internal sockets ON/OFF;
- Combustible gas solenoid safety valve OPEN/CLOSE;
- UV light timer setting.
- ECO Mode activation

The electronic board provides a volt-free connector to switch on/off an external blower or for alarms remotization.

STANDARD UTILITIES

Utilities are located on the back wall of the working area. Connectors for the utilities are located on the top of the cabinet towards the back.

Vacuum tap provisioning. On the back wall, right side.
Gas tap provisioning. On the back wall, right side.
Electrical sockets. On the back wall.
DOP sampling port. Below the work surface, left side.

UV lamp installed on the back wall. Programmable activation time and exposure duration (up to 60min)

OPTIONALS ACCESSORIES

Description	Part No.
Adjustable Stand for Safemate ECO+ 0.9	AS1L310
Adjustable Stand for Safemate ECO+ 1.2	AS1L410
Adjustable Stand for Safemate ECO+ 1.5	AS1L510
Adjustable Stand for Safemate ECO+ 1.8	AS1L610

OPTIONAL UTILITIES

Combustible gas terminal with solenoid valve or inert gas tap terminals
Additional sockets
RS232 data transmission kit (Software not included)
Passive transition adapter for external ducting.
Active extraction kit for ducting with remote motorblower.

TECHNICAL SPECIFICATIONS

DESCRIPTION		***SIZE 0.9***	***SIZE 1.2***	***SIZE 1.5***	***SIZE 1.8***
1.1 POWER SUPPLY					
Mains supply voltage (V~):		220-240			
Mains supply frequency (Hz):		50/60			
Required power line *[720 W service socket included]*	*Eco+ version* (W):	1050	1175	1250	1475
	Eco+ BS version (W):	**1080**	**1250**	**1325**	**1570**
Absorbed power *[fan and light on only]*:	*Eco+ version* (W):	200	325	400	625
	Eco+ BS version (W):	**220**	**350**	**430**	**660**
Current:	*Eco+ version* (A):	4,9	5,3	5,6	6,3
	Eco+ BS version (A):	**5.0**	**5.4**	**5.7**	**6.4**
Main fuses rating:		steatite, 5x20, F10A H, 250 V, **I^2t:** 121			
1.2 REFERENCE STANDARDS					
SAFETY:		IEC 61010-1:2010+A1:2016 / EN 61010-1:2010+A1:2019			
Electrical insulating protection class [IEC 61140]:		I			
ELECTROMAGNETIC COMPATIBILITY (EMC):		IEC 61326-1:2012 / EN 61326-1:2013			
MICROBIOLOGICAL SAFETY:		EN 12469:2000			
Microbiological class protection [EN 12469]:		II			
IP protection degree [IEC 60529]:		Ordinary equipment (IP xxB)			
1.3 DECLARATIONS AND APPROVALS					
Mark of conformity:		CE			
Approvals:	*Eco+ version*	TUV Nord/GS Mark			
	Eco+ BS version	-			

1.4 USE ENVIRONMENTAL CONDITIONS		
Electromagnetic operating area:	industrial	
Use:	indoor	
Altitude (m):	up to 2000	
Temperature (°C):	from 10 to 35	

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Maximum relative humidity (%):		80 for temperatures up to 31 °C, decreasing linearly to 55 at 35 °C			
Max MAINS supply voltage fluctuations (%):		up to ±10			
TRANSIENT OVERVOLTAGE CATEGORY:		II			
POLLUTION DEGREE:		2			
1.5 TRANSPORT AND STORAGE CONDITIONS					
Ambient temperature (°C):		from -5 to 45			
Relative humidity (%):		up to 90			
Atmospheric pressure (mbar):		from 800 to 1060			
1.6 WEIGHT AND DIMENSIONS					
Weight *[without floor stand]*	*Eco+ version* (kg):	210	245	275	335
	Eco+ BS version (kg):	**219**	**257**	**289**	**342**
Overall dimensions L x D x H (mm): *(without floor stand)*		1075 x 795 x 1450	1380 x 795 x 1450	1685 x 795 x 1450	1990 x 795 x 1450
Free space needed around the cabinet (mm): *[left/right/top/front]*		500/500/300/650			
Height of the work surface from the cabinet bottom (mm):		100			
Front aperture dimensions L x H (mm): *(safe - operating height)*		860 x 195	1165 x 195	1470 x 195	1775 x 195
Front aperture maximum height H (mm): *(unsafe - for cleaning and loading only)*		400			
Front aperture in ECO MODE H (mm):		50 ±5			
Working space dimensions L x D x H (mm):		925 x 580 x 700	1230 x 580 x 700	1535 x 580 x 700	1840 x 580 x 700
Safe working area dimensions L x D (mm):		725 x 350	1030 x 350	1335 x 350	1640 x 350
1.7 PERFORMANCES					
Intended life of the equipment (years):		10			
Laminar Air Flow mean velocity [EN 12469](m/s):		0,38 ± 0,02			
Inflow Air Barrier mean velocity [EN 12469](m/s):		0,58 ±10%			
Exhaust Air flow rate (m^3/h):		350 ±10%	480 ±10%	600 ±10%	725 ±10%
Exhaust Air flow ratio (%):		30 ±10%			
Aperture Protection Factor (Apf) [EN 12469]: *(Retention efficiency at front aperture)*		≥1,0 x 10^5			

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Working space air cleanliness class [EN 14644-1]:	ISO 3				
Illuminance [EN 12469] (lux):	>750				
Sound level [EN ISO 3744] (dB[A]):	<65				
Vibration [EN 12469] (mm RMS):	<0,005				
Max increase inside cabinet in temperature from the ambient [EN 12469] (°C):	<5				
Leaktightness index of the cabinet housing [EN 12469]:	LI-C				
Cleanability index [EN 12469]:	CI-B				
Sterilizability index [EN 12469]:	SI-B				
1.8 MATERIALS					
1.8.1 *METAL PARTS*					
Main structure:	cold rolled steel, epoxy powder coated				
Walls inner surface of the working area:	stainless steel AISI 304 - SB finishing				
Working surface:	stainless steel AISI 304 - SB finishing				
Maximum load possible on working surface (kg): *[uniformly distributed]*	15				
1.8.2 *GLASS PARTS*					
Type:	2 layers laminated safety glass				
Front window thickness (mm):	3+3	4+4			
Side windows thickness (mm):	3+3				
UV-C radiations minimum retention (%):	98				
Impact maximum energy sustainable (J): *[EN 61010-1, clause 8.2.2]*	4				
OTHER MATERIALS	Glass, EPDM rubber, filters (anodized aluminum, polyurethane, fibreglass, hot-melt sealant)				
1.8.3 Other materials					
LAF filters dimensions L x D x H (mm):	915 x 610 x 68	1219 x 610 x 68	1525 x 610 x 68	1830 x 610 x 68	
Other features of LAF filter:	fabric equalizer downstream				
EXH filter dimensions L x D x H	*Eco*$^{+}$ *version* (mm):	457 x 457 x 68	610 x 457 x 68	762 x 457 x 90	915 x 457 x 90
	Eco^{+} ***BS version*** (mm):	**457 x 457 x 68**	**610 x 457 x 68**	**762 x 457 x 68**	**915 x 457 x 68**
Additional EXH filter dimensions L x D x H (mm): *[**For BS version only**]*	**457 x 457 x 115**	**610 x 457 x 115**	**762 x 457 x 115**	**915 x 457 x 115**	

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Filters efficiency class [EN 1822-1]:	H14				
Filters global MPPS efficiency [EN 1822-1](%):	99,995				
MPPS diameter [EN1822-1](µm):	0,1 ÷ 0,3				
Expected average life (h):	6000 (1)				
1.8.4 LIGHTING					
Type of lamp:	LED				
LED lamps power (W):	1x 20	1x 27	1x 34	1x 40	
CRI (Color Rendering Index)	80				
Lamp colour temperature (K):	4000				
Average life at 90% yield (h):	40000				
1.8.5 *UV-C LAMP*					
Type of lamp:	UV-C, tubular T8			tubular T10	
UV-C lamp power (W):	1x 15	1x 30		1x 40	
UV-C spectral peak (nm):	253,7				
UV-C lamp average life (h):	8000				
UV-C radiation (W):	4,8	11,6		14,9	
1.9 OUTLET					
1.9.1 *SERVICE SOCKETS*					
Supply voltage (V):	mains				
Maximum load (A): *[distributed on all used sockets]*	3				
Minimum IP protection degree: *[with cover closed]*	54				
1.9.2 *CONNECTOR VFC*					
Output type:	contact NO – voltage free				
Maximum applicable voltage (V):	24 SELV-PELV				
Maximum load (A):	1				
1.10 OPTIONAL ACCESSORIES FEATURES					
1.10.1 *FLOOR STAND*					
Material:	steel tube, epoxy painted				
Non-adjustable floor stand height (mm):	730				
Adjustable floor stand height [min – max] (mm):	*690 – 810* (1)				
Non-adjustable floor stand weight (kg):	18	19,5	20,5	22	
Adjustable floor stand weight (kg):	*25*	*26*	*27*	*29*	

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1.10.2 *INERT FLUIDS UTILITY*				
Valve type:	fine regulation head-valve with PTFE seal tap			
Use:	Inert gases, vacuum, compressed air			
Knob material:	polypropylene			
Max operating pressure (kPa):	300			
Inlet port thread [internal / external]:	G1/4” / G3/8”			
1.10.3 *FLAMMABLE GAS UTILITY*				
Valve type:	ceramic head-valve tap with safety lock			
Usable categories of gases [EN 437]:	1 – 2 - 3			
Knob material:	polypropylene			
Max operating pressure (kPa):	2			
Inlet port thread [internal / external]:	G1/4” / G3/8”			
Solenoid valve inlet thread [female]:	G1/4”			
1.10.4 *LED LIGHTING*				
Type of LED:	SMD 3014			
Lamp power (W):	33	44	54	65
Minimum CRI:	90			
Lamp colour temperature (K):	4000			

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