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Technical Specification

Metal Fume Cupboard Aero

Type:
1200, 1500, 1800, 2100



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1. Description of the main parts of the structure

General description

Reinforced metal fume cupboard for work with acids with air flow control system equipped with graphical HMI interface with the ability to display messages in English. The controller is equipped with an RS485 communication port enabling all fume cupboards to be fastened in one bus and central collection of data on the work of the fume cupboard with MODBUS-RTU transmission.

The construction of the fume cupboard is self-supporting. Structural elements made of high-grade galvanized steel, thickness of 2mm powder coated chemically resistant epoxy paint. Combination of both bearing and plating elements It is made only by screw connections, with the use of nitride, threaded components or specially prepared for this threaded holes. Joints are positioned so that they are not visible both from the forehead and the sides of the fume cupboard. The fume cupboard consists of a working part (comprising a double-sided work chamber) along with the worktop, media panels, front window, ventilation system, lightning, Electronic control systems and base, where cabinets can be mounted. Side panels are made in the shape of an arc. They include an air flow sensor panel and a window height lock button.

Construction of the working part, Working chamber made of materials adapted demands of specific fume hood. The construction of the fume cupboard eliminates the double wall system and use the direct extract in the fume cupboard, which simultaneously functions as a collector. In the chamber there are vertical spoilers which prevent the formation of a backflow effect. The horizontal spoiler under the window also prevents uncontrolled recoil of the air jet. In the ceiling of the working chamber there is installed pipe for ventilation connection of diameter suitable for the fume cupboard series, made of PP, with integrated condensate collector from the ventilation system, protection against flooding of the fume cupboard. The upper part of the fume cupboard (roof) has a security-absorbing opening that absorbs the energy of expansion. The working chamber has the ability of installing on the rear wall a chemical rack consisting of 3 horizontal bars. The lighting of the chamber is made in IP 44 version – is located diagonally under the ceiling and isolated from the working chamber, A transparent panel separating the lighting from the chamber.

Window made in steel frame, tempered glass, applied system to prevent uncontrolled drop of the window. Windows are run on a counterweight basis using a belt system and toothed wheels, this allows for smooth and quiet position control. The window has a height lock button at 500mm. Button additionally secured with a lock. The entire window guiding system: Guides, slides, structural elements, belts and cogwheels, are hidden inside the side panels of the fume cupboard, so they do not come in contact with aggressive substances and provide years of trouble-free operation.

Worktop made of solid ceramics with integrated raised edges on each side. Worktop shape adjusted to the cross section of the work chamber (maximum use of space). Thickness of the worktop is 28 mm across the flat surface and 35 mm along the raised edge. Ceramic sink made also of solid ceramics, located along the rear wall of the working chamber, (Taped from bottom to worktop). Loading capacity of the worktop, at least 200 kg.

Solid ceramic with raised edge: ceramic sinter homogeneous throughout the cross-section and longitudinal. Material free from solvents and any toxic compounds, resistant to impact and abrasion, non-flammable, UV resistant. Material resistant to all acids, alkalis, solvents and dyes at all concentrations and temperatures used in laboratories (with the exception of hydrofluoric acid), resistant to staining and chemically resistant. Any contaminants completely removable from the surface, including soiling from chemical dyes.

All thicknesses made without baseplates and up to 1800mm without epoxy joints. Surface top and all available edges of worktop glazed. Elevated edge as a homogeneous sinter with the rest of the worktop, without using any junction.

Fume cupboard fitted with a system that monitors the correct functioning of the ventilation in the fume cupboard located on the right side of the fume cupboard, on the sidebar.



2. Technical Data

Dimensions				
Model	1200	1500	1800	2100
Width (mm)	1200	1500	1800	2100
Depth (mm)	910			
Height closed/open sash (mm)	2400			
Worktop height (mm)	900			
Workspace dimensions:				
width (mm)	1150	1450	1750	2050
depth (mm)	782	782	782	782
height (mm)	1435	1435	1435	1435
Recommended air flow speed at front face (m/s)	0,3 - 0,5			
Extract-air manifold (mm)	Ø160	Ø200	Ø250	Ø250

Variants		
Element	Standard	Optional
Worktop (for details see chapter 3.4)	<ul style="list-style-type: none"> • Solid Ceramics 	<ul style="list-style-type: none"> • Durcon epoxy resin • Polypropylene • Stainless steel • Phenolic resins • Quartz-Granite conglomerate
Work chamber lining (for details see chapter 3.5)	<ul style="list-style-type: none"> • Steel covered with epoxy paint 	<ul style="list-style-type: none"> • Large-size Buchtal ceramics • Polypropylene • Max Resistance phenolic resins
Sash window	<ul style="list-style-type: none"> • Steel frame 	<ul style="list-style-type: none"> • Aluminium frame with single glass pane • Polycarbonate panes available for both frame types
Flow control (for details see chapter 3.6)	<ul style="list-style-type: none"> • Q-Flow Advanced 	<ul style="list-style-type: none"> • Q-Flow Advanced EXT • Schneider FM 100 • Schneider FM 500 • Schneider iCM • Q-Flow Touch

Sash operation	<ul style="list-style-type: none"> • Manual 	<ul style="list-style-type: none"> • Manual with motion detector and sash open signalling (Manual Protect) • Automated with motion detector (Auto Protect)
Lighting	<ul style="list-style-type: none"> • Fluorescent lamp with 2 tubes 	<ul style="list-style-type: none"> • EX explosion-proof lamp with 2 tubes
Fittings (for details see chapter 8)	<ul style="list-style-type: none"> • Two water taps in the back wall, operated from the front panel • Sink made of the same material as worktop • Two 230V 16A sockets on the front panel 	<ul style="list-style-type: none"> • Up to 4/6/8/12 (1200/1500/1800/2100 model) gas taps for flammable and inflammable gases, vacuum, air and other, installed in the work chamber, all operated from the front panel • Additional 230V 16A sockets • 400V socket • Scaffolding inside the work chamber
Side panel glazing	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Available for one or both sides
Underbench cupboards	<ul style="list-style-type: none"> • Laminated chipboard ventilated cupboard with sliding doors • PVC internal lining • 1 shelf 	<ul style="list-style-type: none"> • Lock • Polypropylene cupboard
Guarantee	<ul style="list-style-type: none"> • 24 months 	<ul style="list-style-type: none"> • 36 months

3. Electrical installation

The Q-Flow control system electrical installation consists of:

- a) Air flow sensor - integrated on the mainboard
- b) Open sash sensor - circuit-breaker switch indicating sash opening above 50 cm
- c) Power adaptor - integrated on the mainboard
- d) Lighting control circuit - integrated on the mainboard
- e) Ventilation fan control circuit - relay output on the mainboard
- f) External alarm signalling devices control circuit - - relay output on the mainboard (optional)
- g) Electrical sockets control circuit - relay output on the mainboard (the sockets may also be installed with this relay bypassed - power always on)

The fume cupboards' wiring system consists of:

- h) Two 230V 16A electrical sockets
- i) Fluorescent lighting with two glow discharge tubes type JP54 (2x36W)
- j) Electrical wiring 1,5 mm²

The lighting power supply may be connected to the same phase as the control system, in which case the L and L1 power inputs on the mainboard should be bridged.

The phase on input L1 feeds the lighting.

The Q-Flow control system user manual is attached in a separate document.

4. Technical requirements

Installation instructions

Fume cupboard installation is performed by the manufacturer, together with water, sewage, ventilation and electrical connections. The user is obliged to install a residual-current device on the power line.

The fume cupboard should be stored in a safe place before installation, and steps should be taken to minimise the risk of damaging the cupboard in any way. Similar precautions should be taken if there is any structural work to be done in the vicinity of the cupboard. The recommendations supplied by the manufacturer should be complied with at all time.

Prior to the delivery the possible access to the laboratory should be inspected (preferably using the "Delivery checklist" supplied by the manufacturer) and a suitable storage place for storing the cupboards before installation should be prepared. If the corridors do not provide a sufficient access way, an outside scaffolding for access through the window might be necessary.

When evaluating the possible access, special attention should be drawn to:

- door dimensions;

- staircases and landings;
- lift load capacity and dimensions;
- corridor dimensions, corridor bends and potential obstacles

The receiver should give the installation crew full information on the access way to the desired installation place.

Fume cupboards may be installed in premises at least 2,75m high and have to be connected to an operational forced ventilation system.

Fume cupboard cannot be installed if the air temperature or humidity is significantly different from the temperature or humidity at the storage place. Storing is only allowed in the following conditions:

- a) air temperature -10°C to $+30^{\circ}\text{C}$
- b) relative humidity at 20°C : 40-70%

If it is necessary to install the fume cupboards before drying of the building, after finishing the works the building should be heated and dehumidified for a couple of days. It is recommended to use dehumidifiers instead of just heating devices, if this is not possible, the premises should be well ventilated during the process.

It is recommended that all the room surfaces, including ones that will be covered by the fume cupboard are renovated before installation. This will reduce the need for renovation if the laboratory should be rearranged in the future. It is recommended to finish all the construction works before installing the fume cupboards. If not possible, the cupboards should be well protected from damage before commissioning.

The fume cupboard's supports have adjustable feet, that allow levelling of the worktop. This should be done each time the cupboard is moved, before commencing work in it. There is a possibility of fixing the fume cupboard to the wall, using a method recommended by the manufacturer.

The placement of the cupboard should provide sufficient space for the arrangement of service devices. The service devices should be divided and coded into the following groups:

- a) electrical;
- b) communication;
- c) water;
- d) water-vapour, steam and condensate;
- e) each gas;
- f) sewage.

The cold and hot water and steam pipes need to have thermal insulation. All the pipes should be fixed in a way preventing them from deformation during use.

The power feeding devices placement depends on the fume cupboard positioning. Placing the electrical connections on the ground should be avoided. Wall connections should be easily accessible.

The sockets' openings (including typical voltage electric networks, electric networks of atypical voltage, computer and communication networks) should be covered and protected from liquid penetration. The sockets have to be made in conformity with

national technical standards and have to be cased in a metal or plastic housing.

If electric equipment is built into the fume cupboard, one has to assume the possibility of contact with liquids and corrosives, mechanical impact or contact with flammable gases and fumes and choose an adequate way of securing the equipment.

Installation conditions:

1. Ventilation

Before installation of the fume cupboards the client is obliged to provide an exhaust ventilation system, allowing adequate air exchange rate according to a project, prepared by a qualified designer. The installation should be commissioned by an authorised supervision inspector. The ventilation system should comply with the EN 14175-2 regulations.

2. Water supply

The water output should consist of a ½" ball valve behind the fume cupboard and at the height of no more than 50–60 cm from the floor.

3. Sewage

The sewage input should be released from the floor or a wall behind the cupboard with a PP pipe connection 50 mm in diameter, placed approximately 20-25 cm above the floor.

4. Electrical installation

An electrical (230V, 50Hz) installation should be prepared, with YDYP 3x2,5 mm² cable, ending with an electrical box at 50cm above the floor, behind the fume cupboard.

5. Gases

The possible natural gas or other technical gases installations (12-15mm diameter) should be fitted on the wall at no more than 50cm from the floor, behind the fume cupboard. A cut-off valve should be mounted outside of the fume cupboard space and easily accessible.

5. Operating conditions

Fume cupboards should work in laboratories, heated or ventilated equipment rooms, heated or ventilated halls. It is forbidden to locate them in places exposed to vibrations, high temperature or mechanical impacts.

Fume cupboards should be used only in places secured from the risk of fire, explosion, high temperatures or influence of magnetic and electromagnetic fields.

Fume cupboard should be used only in places where it is not necessary to use personal protection, according to Health and Safety at Work rules.

Maximum permissible concentration of gases (for a single gas) is:

Gas	Concentration (mg/l)
SO ₂	0,025
H ₂ S	0,025
Cl ₂	0,003
NO	0,035
NO ₂	0,035
NH ₃	0,040

In the case of gas mixtures, the total of concentrations for all of the component gases, defined in percent, cannot be higher than 100% of maximum permissible concentration.

6. Fume cupboard functioning

Fume cupboard performs two tasks:

- Primary - contains and conveys potentially dangerous or irritating fumes from the fume cupboard workspace to an outside discharge point where it can be safely dispersed at low concentration.
- Secondary - the underbench ventilated cupboard designed for short-term storing of chemicals and reagents

The work chamber is ventilated through a baffle system, with slots for full width of the cupboard situated on the back wall just above the worktop (for heavy gases and fumes collection) and at the top of work chamber (for light gases and fumes collection). On the front face the work chamber has a sash, with single non-moveable glass pane or two horizontally moveable panes (depending on frame type). The sash has limiters, that leave an air intake gap between the sash and worktop after the sash is closed.

Media controls are located on exchangeable panels below the worktop. Electric sockets are also mounted on these panels.

The Q-Flow monitoring and control system is installed as standard. Other systems from Poll Lab or Schneider Electronics are also available.

The Q-Flow is available with the following functionality:

- flow monitoring with optical and acoustic signalling of insufficient airflow
- LCD display showing the air flow rate in m³/h and current time when in standby mode
- sash opening height of >50cm monitoring and signalling
- monitoring and signalling of alarm states
- "Night mode" - for monitoring work with reduced flow rate (lower minimum flow speed alarm level)
- output for external alarm signalling devices (optional)
- fume cupboard lighting switch with timer

- battery backup with battery protection
- battery work control LED
- timer with acoustic signalling
- different buzzer sounds for different alarm states
- 230V sockets control switch with programmable switch-off time (optional)
- ventilation fan power-on control
- connections for in-room temperature and humidity sensors
- connections for workspace temperature and humidity sensors (caution - sensors not resistant to aggressive work environment)

Information regarding other available control and monitoring systems may be found in appropriate system's specifications.

There are two additional safety systems available for Q-Flow:

Manual protect - consists of a motion sensor monitoring the presence of the operator in front of the fume cupboard, sash height sensor and a signalling LED on the control panel. If no motion is recorded in front of the fume cupboard for a defined time and the sash is open, the LED begins to flash, signalling that the sash should be lowered for improved safety.

Auto protect - consists of a motion sensor working similarly to the one in Manual protect, sash height sensor and an electric motor capable of moving the sash. If no motion is recorded in front of the fume cupboard for a defined time and the sash is open, the motor closes the sash to improve safety and limit the required air flow, what helps reduce the running costs. A light barrier in the sash stops the movement if any obstacles, protruding through the sash opening are found. This may also be used to stop the sash by hand. The system has three operating buttons - "Up", "Down" and "Stop", all positioned on the side panel. These can be used to move the sash, although it also incorporates movement initialisation by sliding the sash by hand.

7. Fume cupboard operation

- Before commencing work in the cupboard it is required to switch on the light, ventilation and control systems;
- After finishing work, the ventilation should keep working until all fumes are removed.

Rules of conduct during work

- The bigger the range of different activities performed in the fume cupboard, the higher the risk of explosion;
- Closed sash is the best way to protect from contaminants and possible explosion;
- The sash should be opened only when it is necessary for the current activity;
- During work when the sash is lifted, it is recommended to avoid fast and violent moving through the air flow, to prevent the contaminants from the fume cupboard from leaking out of it and into the laboratory;
- Experimental work conducted in the fume cupboard should be limited only to the necessary;
- It is required to regulate the air flow through the work chamber, according to currently performed actions and used chemicals;
- Work chamber should be periodically cleaned from the residues left after work;
- The baffle and ventilation system should be periodically cleaned.

Prohibited actions:

- It is forbidden to conduct work in the fume cupboard without prior connecting to the ventilation system;
- The maximum permissible heat loads should never be exceeded;
- Heating devices should be positioned on distance feet
- It is forbidden to conduct work in the fume cupboard with improper chemical load;
- The minimal distance between a heat source and work chamber walls should never be exceeded;
- The fume cupboard should never be considered a storage place for reagents, flammable substances, acids and alkalis;
- Fume cupboards according to

8. Conservation

Fume cupboard conservation includes:

- Keeping all the surfaces clean;
- Periodically checking all the earthing connections, especially ones for ventilation shaft, underbench cupboard and chassis;
- Temporarily securing any scratches and damages to prevent corrosion;
- The sash is held by a counterweight in any position. The counterweight and sash are connected by steel cables covered in plastic. The cables should be checked once a year and changed if any signs of damage are found;
- The air flow monitoring system should be checked at least once a year. If any inconsistency between the readings and measurements is found, the system and alarm levels have to be recalibrated.

Cleaning

- Each time after finishing work, but at least once a day the cupboard should be cleaned from any liquid splashes, especially inside the work chamber;
- Once a week all the cupboard's surfaces should be cleaned with warm water with addition of a surface-active agent, then washed off with warm water and wiped dry;
- When necessary but at least once every 3 months the sash sliding guides should be lubricated with vaseline;
- Common household and technical cleaners (including alcohol-based, ethyl or propyl alcohol) may be used for cleaning the cupboard;
- If stains occur benzine or kerosene should be used
- It is prohibited to use organic solvents with medium polarization like acetone, ethylene or chlorinated water with carbon;
- It is prohibited to use scrubbing cleaners, as they may have an adverse effect on furniture surface smoothness.

Electrical, water and sewage installation repairs

- For access to these installations the underbench cupboard should be taken out of the fume cupboard chassis. Limited access is also available after removing the side back covering panel.

9. Health and Safety

It is required to assure conformity with all health and safety and fire prevention rules mandatory in the laboratory and other common rules, like:

- Making the workplace safe and eliminating or controlling health risks;
 - Ensuring the premise and machinery are safe and that all work safety systems are set and followed;
 - Providing adequate health and welfare facilities;
 - Giving the workers information, instructions, training and supervision necessary for their health and safety;
 - Consulting the workers on health and safety matters;
-
- Any repairs of the electrical, gas or water installations may be performed only by authorised personnel and after disconnecting from the supply installation.

10. Warranty and repairs

Pol Lab Sp. z o.o. sp. K. guarantees the product for the time of 24 months from the selling date, provided that it is used properly and according to instructions. The manufacturer is obligated to repair the device in 14 days, unless there is a necessity of delivering parts from abroad. All the repairs have to be performed by authorised service personnel.



11. Deklaracja zgodności

DEKLARACJA ZGODNOŚCI

Declaration of Conformity



My niżej podpisani (producent):

We, the undersigned (manufacturer)

Nazwa firmy: POL-LAB Sp. z o.o. Sp. k.
Company name
Adres: ul. E. Kwiatkowskiego 19, 43-365 Wilkowice
Address
Kraj: POLAND
Country
Telefon/fax: +48 33 814 06 93 / +48 33 810 16 28
Phone/Fax number
Adres e-mail: biuro@poll.pl
e-mail

Niniejszym deklarujemy ponosząc za to pełną odpowiedzialność że poniższe urządzenie:
Hereby declare under our sole responsibility that the product listed below:

Nazwa urządzenia: Dygestorium serii Aero
Product name Fume hood, Aero series

Typ: 1200, 1500, 1800, 2100
Type:

do którego odnosi się niniejsza deklaracja, spełnia wszystkie postanowienia **Dyrektywy 2006/42/WE** oraz jest zgodne z wymogami zasadniczymi zawartymi w normach:
to which this declaration relates, fulfills all Directive 2006/42/WE provisions and is in conformity with the essentials requirements of standards:

PN-EN 61010-1:2011	Wymagania bezpieczeństwa dotyczące elektrycznych przyrządów pomiarowych, automatyki i urządzeń laboratoryjnych. Część 1 – Wymagania ogólne. <i>Safety requirements for electrical equipment for measurement, control and laboratory use. General requirements</i>
PN-EN 60529:2003	Stopnie ochrony zapewnianej przez obudowy. (Kod IP) <i>Degrees of protection provided by enclosures (IP code)</i>
PN-EN 61140:2005	Ochrona przed porażeniem prądem elektrycznym - Wspólne aspekty instalacji i urządzeń <i>Protection against electric shock - Common aspects for installation and equipment</i>
PN-EN 61293:2000	Znakowanie urządzeń elektrycznych danymi znamionowymi dotyczącymi zasilania elektrycznego - Wymagania bezpieczeństwa <i>Marking of electrical equipment with ratings related to electrical supply - Safety requirements</i>
PN-EN 14175: 2006	Wyciągi laboratoryjne <i>Fume cupboards</i>
PN-EN 14056:2005	Meble laboratoryjne. Zalecenia dotyczące projektowania i instalowania. <i>Laboratory furniture - Recommendations for design and installation</i>
PN-EN 13792:2003	Kod barwny do oznaczania zaworów w obsłudze laboratoriów. <i>Colour coding of taps and valves for use in laboratories</i>
PN-IEC 60364-7-713:2005	Instalacje elektryczne w obiektach budowlanych. Wymagania dotyczące specjalnych instalacji lub lokalizacji. Meble. <i>Electrical installations of buildings - Part 7: Requirements for special installations and locations - Section 713: Furniture</i>

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Document reference no.

Osoba odpowiedzialna: Wojciech Łaszczok

Name of responsible person

Za Spółkę POL-LAB
Spółka z ograniczoną odpowiedzialnością sp. k.



Wojciech Łaszczok
Komplementariusz

Data: 19.04.2017

Date

Podpis:

Signature:

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