ThermoFisher SCIENTIFIC

Biological safety cabinets

1500 Series B2 Biological Safety Cabinet

thermo scientific

Total exhaust biological safety cabinet

Greater dilution of volatile toxic chemicals

Class II, Type B2 biological safety cabinets are built for applications that require greater dilution of volatile toxic chemicals or the aseptic processing of some hazardous drugs. The Thermo Scientific™ 1500 Series B2 Biological Safety Cabinet (BSC) features an ergonomic design, enhanced DC motor technology, and an innovative airflow system that supports operator safety.

A complete laboratory containment system includes not only the selection of the proper cabinet, but also the correct setup of the exhaust system, building ventilation, and room pressurization. Our experts can help provide guidance to help ensure your complete lab is set up safely.

The 1500 Series B2 BSC is designed for applications requiring no recirculation within the cabinet and higher volumes of exhaust for greater dilution of volatile toxic chemicals.

The product meets the highest quality and safety standards and is fully compliant with NSF/ANSI 49 for Class II biological safety cabinets. The efficiency of the DC motor results in reduced energy consumption and cost savings. Our experienced scientists are available to understand your applications and offer support to select the right model to meet your laboratory requirements.

1500 Series B2 total exhaust biological safety cabinet

Differences between A2 and B2 cabinets

Choose the right model for your laboratory

Thermo Scientific™ 1500 Series products address every common use of the Class II biological safety cabinet. By selecting the Thermo Scientific™ 1500 Series A2 BSC, the 1500 Series A2 BSC with a thimble exhaust, or the 1500 Series B2 BSC, your facility can meet all applicable recommendations from NSF/ANSI 49, USP <797>, and USP <800> for the preparation of sterile hazardous and nonhazardous drugs in Class II biological safety cabinets.

Biological safety cabinet selection guide: A2 versus B2

	1500 Series A2 cabinet vented to the room	1500 Series A2 cabinet with thimble exhaust	1500 Series B2 cabinet with direct duct "total exhaust"
Exhaust technology recommendations for applications using:			
Particulate contamination and hazards including biological agents (viruses and bacteria) at biosafety levels 1, 2, 3, or 4	Recommended	Exceeds requirement	Exceeds requirement
Agents in row 1 and/or for use with volatile chemicals if permitted by a chemical risk assessment	No	Recommended	Recommended
Agents in row 1 and/or for the preparation of compounded sterile preparations in accordance with USP <797>	Recommended	Exceeds requirement	Exceeds requirement
Agents in row 1 and/or for the preparation of hazardous drugs in accordance with USP <800>	No	Recommended	Recommended
Exhaust features			
Vulnerability of system to exhaust variation	None	Minimal	Significant
Additional annual cost of required exhaust	None	$1,900 to $2,900 annually*	$3,000 to $4,500 annually*

* Cost estimates are based on the required exhaust volume for the cabinet type, and assume a cost of $4.50 per cfm per year for replacement air. Mills E and Sartor D (2005) Energy use and savings potential for laboratory fume hoods. *Energy* 30(10)1859-1864.

Innovative airflow design

Air recirculation and external exhaust considerations

Air recirculation factors

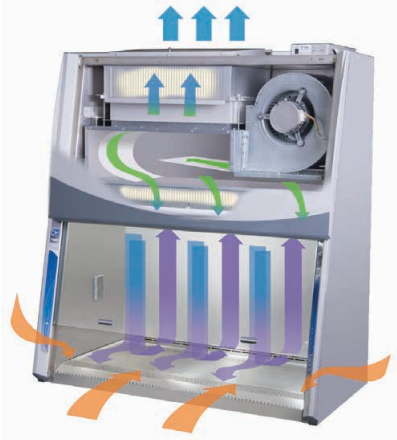
Air recirculation inside the work chamber is an important factor to consider when choosing between A2 and B2 cabinet models. The 1500 Series A2 cabinet features recirculation of filtered air to the work chamber. Air from the external environment and filtered air from the sample work area mix inside the cabinet plenum. Some of the mixed air is filtered and exhausted out of the cabinet. The remaining air is filtered and recirculated into the work area. This process of recirculation results in rapid dilution of gases or volatile chemicals released inside the sample chamber.

The 1500 Series B2 cabinet has **no** recirculation inside the work chamber. Air from the external environment is drawn into the blower motor plenum, filtered, and then pushed into the work area as downflow air. All of the downflow air and all of the air entering the cabinet through the front opening (inflow) air is "totally exhausted," eliminating the risk of sample or user exposure to harmful chemicals through recirculation.

Due to this non-recirculated airflow and total exhaust system, the 1500 Series B2 cabinet provides a higher level of product and user protection from high concentrations of some volatile toxic chemicals and radionuclides.

A2 airflow

30%–40% exhausted



60%–70% recirculated

B2 airflow

100% exhausted

0% recirculated

Room air

HEPA-filtered air

Room air is drawn into the inlet grille. Air in the plenum beneath the work surface is a mix of unfiltered room air and air from the work area. The blowers draw the mixed air to the plenum above the work area of the cabinet, where approximately 60%–70% of the air is recirculated through the supply HEPA filter and back over the work area. The remaining air is discharged to the environment after passing through the exhaust HEPA filter.

Unfiltered air under negative pressure

Unfiltered air under positive pressure

Room air is drawn through the top of cabinet. The air is HEPA-filtered before flowing down through the work area. Room air is also drawn into the inlet grille. All of the contaminated air is drawn under the work surface, then up the rear plenum and through the exhaust HEPA filter. A dedicated remote blower and exhaust system draws 100% of the cabinet inflow and downflow out of the lab as filtered exhaust.

Exhaust considerations

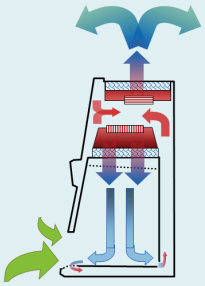
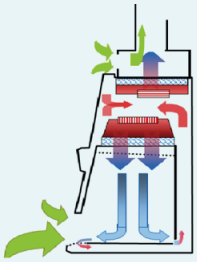
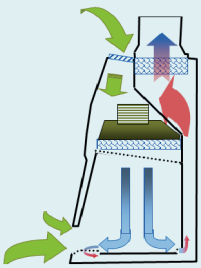
The external exhaust method is the second factor to consider when choosing between A2 and B2 models. The 1500 Series A2 cabinet may be safely exhausted back into the lab environment or to the outside of the building through a thimble exhaust connection. If the cabinet is only used to contain biological or other particulate hazards, the filtered and clean exhaust can be safely vented into the room.

The 1500 Series A2 cabinet with thimble exhaust should be used when work is performed with volatile toxic chemicals and radionuclides, when permitted by a chemical risk assessment. Class II, Type A2 cabinets do not trap gases with a HEPA filter, making it necessary to exhaust the cabinet out of the lab through an optional thimble connection.

Class II, Type B2 cabinets do not have internal exhaust fans and depend on external exhaust systems to operate. The 1500 Series B2 cabinet exhausts more air than the 1500 Series A2 cabinet with thimble connection and will cost more to operate.*

Deciding between the 1500 Series A2 or 1500 Series B2 cabinet is a balance between your application and the total cost of operation over the lifetime of the cabinet.

* For example, a nominal 4 ft. B2 model will draw 282 cfm through the window and the balance through the supply HEPA filter as downflow to exhaust 852 cfm. A nominal 4 ft. thimble-connected A2 model will only exhaust 360 to 450 cfm (depending on whether the front opening is 8 or 10 inches high).

			
	Class II, Type A2 vented to room	**Class II, Type A2 with thimble exhaust**	**Class II, Type B2 with direct duct "total exhaust"**
Downflow air	The downflow air is supplied by a filtered mix of laboratory and sample chamber air.	The downflow air is supplied by a filtered mix of laboratory and sample chamber air.	The downflow air is supplied entirely by filtered air from the laboratory.
Inflow air	The inflow air is drawn from the laboratory into the front grille and prevented from entering the cabinet work area.	The inflow air is drawn from the laboratory into the front grille and prevented from entering the work area.	The inflow air is drawn from the laboratory into the front grille and prevented from entering the work area.
Exhaust air	The filtered exhaust air is vented into the laboratory.	The filtered exhaust air is completely captured by the thimble and exhausted out of the building.	The filtered exhaust air is completely exhausted through the direct duct connection and exhausted out of the building.

Important note: The 1500 Series B2 BSC requires an exhaust system capable of drawing 818 cfm against a negative static pressure of 1.8" w.g. for the 4-foot wide unit and 1,385 cfm against a negative static pressure of 2.5" w.g. The exhaust flow must be adjustable to allow for variation over the life of the exhaust HEPA filter.

Effective installation

Three key considerations

Exhaust

- A dedicated exhaust is recommended for each 1500 Series B2 cabinet to help ensure steady exhaust volume
- Roof blowers should offer a stack that extends straight upward at least 10 feet above the roof surface to avoid building exhaust to be recaptured by intake channels
- Roof exhaust fans should be energized by direct-connected electric motors to avoid breakdowns caused by fan belt failures
- The exhaust system can be fitted with a back draft damper to prevent the reversing of airflow in the system, if applicable
- If hazardous biological agents are used in the research application, a gasketed damper is provided to help ensure easy isolation of the cabinet for decontamination

Room pressurization

- Extreme room pressurization differentials can negatively impact the working environment; using the exhaust of the 1500 Series B2 cabinet as the only exhaust from the lab is not recommended
- The supply and exhaust airflow of the lab should be installed separately to help ensure that system balance can be maintained independently without sacrificing performance of the 1500 Series B2 cabinet

Managing filter life

- The downflow filter on a 1500 Series B2 cabinet is subjected to more than twice the rate of loading as a recirculating A2 cabinet
- The auto-compensation feature in the 1500 Series B2 cabinet allows for safe use of air prefilters for additional extension of HEPA filter life
- If the 1500 Series B2 cabinet is installed in rooms supplied with HEPA-filtered air, then filter loading will be minimized and filter life will increase

Simplifying safety decisions

The 1500 Series B2 BSC—designed for safe and easy work with gases and volatile chemicals

Operator comfort

10° sloped window for ergonomic posture helps reduce strain and fatigue associated with long working hours.

Ease of cleaning

Single-piece stainless steel work tray helps minimize loss of pipette tips and spills into the drain pan. 304 stainless steel interior withstands routine disinfection.

Enhanced user protection

An auto-compensation feature allows the safe use of downflow air prefilters. Automatic adjustment of downflow velocity during HEPA filter loading provides added product protection.

Contamination control

Timed UV light option helps reduce the risk of sample contamination and helps lower bulb replacement costs.

Convenient user interface

5” touchscreen display allows visualization of cabinet conditions for monitoring.

- **Airflow status**—displays real-time inflow and downflow values
- **Alerts and alarms**—visual and audible signals inform users of the cabinet conditions
- **User convenience**—programmable UV light timer and HEPA filter life indicator
- **Data logging and connectivity**—exports data logs and records via USB

UV light option

Large in-cabinet display

Ordering information for 1500 Series Class II, Type B2 Biological Safety Cabinets

Specifications	4-foot cabinets				6-foot cabinets			
Cat. No.	1501B2	1503B2	1513B2	1513B2 F, G, or M	1512B2	1534B2	1524B2	1524B2 F, G, or M
Cat. No. (with factory-installed UV light)	1502B2	1504B2	1514B2	1514B2 F, G, or M	1519B2	1543B2	1529B2	1529B2 F, G, or M
Electric requirements	115 V, 50/60 Hz	230 V, 50/60 Hz			115 V, 50/60 Hz	230 V, 50/60 Hz		
Internal receptacles and power cord	US	China/ Australia	Nema 6–15	Avail. with Schuko (F), UK (G), or India (M)	US	China/ Australia	Nema 6–15	Avail. with Schuko (F), UK (G) or India (M)
Damper	10-inch diameter gasketed damper included							
Exterior dimensions H x W x D in. (cm)	72.6 x 54.3 x 31.6 (184.4 x 137.9 x 80.3)				72.6 x 78 x 31.6 (1,844 x 1,981 x 803)			
Interior dimensions H x W x D in. (cm) (Work area is taller in front, shorter in back)	25.7–29.2 x 48.5 x 25.5 (65.3–74.2 x 123.2 x 64.8)				25.7–29.2 x 72.5 x 25.5 (65.3–74.2 x 184.1 x 64.8)			
Working height of front window in. (cm)	8 (20.3)				8 (20.3)			
Maximum opening height of front window in. (cm)	21.75 (55.2)				21.75 (55.2)			
Work surface area in.^{2} (m^2)	854 (0.55)				1,276 (0.82)			
Shipping dimensions H x W x D in. (cm)	81 x 72 x 44 (205.7 x 182.9 x 111.8)				81 x 86 x 44 (205.7 x 218.4 x 111.8)			
Net weight lb (kg)	545 (247)				720 (327)			
Shipping weight lb (kg)	646 (293)				836 (379)			
Exhaust/air volume measured with DIM cfm (m^3/h)	665 cfm @ 1.8" w.g. (1,130 cmh @ 448 Pa)				998 cfm @ 2.5" w.g. (1,696 cmh @ 623 Pa)			
Exhaust/air volume measured with traverse cfm (m^3/h)	818 cfm @ 1.8" w.g. (1,390 cmh @ 448 Pa)				1,385 cfm @ 2.5" w.g. (2,353 cmh @ 623 Pa)			
Heat emission at 25°C ambient kW	0.022				0.024			
Supply/exhaust air filter	99.99% @ .3 µm				99.99% @ .3 µm			
Certification	NSF/ANSI 49, ETL, ETL, CE				NSF/ANSI 49, ETL, ETL, CE			
Sound pressure level dB(A)	65				66			
Lighting power fc	91				91			
Power consumption, operating set point kW*	0.28				0.37			
Current consumption amps	2.4	1.2	1.2	1.2	2.4	1.2	1.2	1.2
Receptacles (rear wall)	2 duplex, GFI	2 single	2 duplex	2 single	2 duplex, GFI	2 single	2 duplex	2 single

* Clean filters, fans at full speed, interior lighting activated. ETL tests the products to the following UL and Canadian standards: UL Standard 61010-1, CAN/CSA Standard C22.2 No. 1010.1. CE Mark applies only to 230 V models.

Options and accessories

Accessory	Description	Cat. No.
Stand	Adjustable-height base stand for 4 ft. cabinet (30–36")	3730402
	Adjustable-height base stand for 6 ft. cabinet (30–36")	3730602
	30" fixed stand for 4 ft. cabinet for seated applications	3990001
	36" fixed stand for 4 ft. cabinet for standing applications	3990005
	30" fixed stand for 6 ft. cabinet for seated applications	3990003
	36" fixed stand for 6 ft. cabinet for standing applications	3990007

Accessory	Description	Cat. No.
Filter	Exhaust prefilter kit for 4 ft.	3288601
	Exhaust prefilter kit for 6 ft.	3288603
	Downflow prefilter (replacement) media, 4 ft.	3850500
	Downflow prefilter (replacement) media, 6 ft.	3850501

Accessory	Description	Cat. No.
Other	Floor anchoring brackets	5190200
	Service valve kit (rated for use with air and noncombustible gas applications)	3747502
	UV add. kit (universal voltage)	3289100
	SmartPort™ cord and cable port kit	3282400
	Remote communication board	3289000
	IV bag holder kit for 4 ft. cabinet	3288901
	IV bag holder kit for 6 ft. cabinet	3288903
	Back draft damper 10-inch diameter	3858800
	4 ft. bag for Bag-in/Bag-out	3776000
	6 ft. bag for Bag-in/Bag-out	3776008

Learn more at **thermofisher.com/1500b2**