

# 150 CFM - 8,000 CFM

## Deep Bed – Vertical Bed System (VBS)



### MODEL NUMBER NOMENCLATURE

<b>VBS</b>	Model "VBS" Vertical Bed System		
<b>606</b>	Length of System in ft.		
	Width of System in ft.		
<b>136</b>	Media Bed(s)	136	One 36" deep bed
<b>SS</b>	Construction	316L SS	Stainless
<b>DT</b>	Fan Location	BT	Blow Thru
		DT	Draw Thru
<b>XX</b>	Options (See List Below)		

### OPTIONS

- + IL (Intake Louver); IH (Intake Hood);
- + PF (Pre-Filter); MG (Mist and Grease Eliminator); FF (Final-Filter)
- + PH(EorG) (Preheater Electric or Glycol); SWPH (Summer/Winter Preheater);
- + AC (Packaged Air Conditioning or Dehumidification);
- + INS (Insulated); DW ( Double Wall Construction);
- + UF (Upflow); DF (Down Flow);
- + MB (Multiple Media Beds);
- + PW (Prewired); RW (Remote Wired);
- + EF (Enclosed Fan);
- + RF (Redundant Fans);
- + DS (Discharge Silencer)

The model described above is a Vertical Bed System: 6 ft. wide, 6 ft. deep with one 36" deep bed, welded stainless steel construction in a Blow-thru vertical airflow configuration.

### SYSTEM DESCRIPTION

The Unisorb Canada VBS System is a complete self-contained, vertical airflow package. This deep bed system provides continuous high efficiency air purification for contaminated air streams ranging in volume from 150 to 8,000 CFM.

The Unisorb Canada VBS System comes in either Blow-thru or Draw-thru configurations. Blow-thru configurations are generally used for corrosion control applications. Draw-thru configurations are generally used for odor control or environmental emission applications.

The standard VBS air purification system includes the following:

### CONSTRUCTION

Standard casing construction is welded 14-gauge stainless steel. Welded insulated casing is available when required for heat loss or condensation purposes. An optional housed blower plenum enclosure is available when requested for noise suppression, unique plenum ducting requirements, or vandal proofing. An optional enclosed blower section is available when requested for noise suppression, unique plenum ducting requirements, or vandal proofing.

### PRE-FILTER SECTION

This section provides a pre-filter to protect the downstream system components. The 2" deep - 35% MERV 8 pre-filter is used for the retention of particulates, protecting the chemical media bed section from being blinded by particulates. Optional 95% MERV 14 after filters are available for protection against blinding of the media bed by smaller particulates. Unisorb ultra high efficiency 3-stage mist and grease prefiltration is used on moist sewage collection and treatment systems.

A magnehelic differential pressure gauge is used to locally monitor the pressure drop across the particulate filter sections to determine when changeout or cleaning of filters is necessary.

An optional photohelic differential pressure gauge/switch is used when a set of contacts is required to provide local monitoring and to send an alarm signal to a remote location to indicate when the filters need to be checked or changed. A side access door with quick release, snap acting type, positive pressure latches is used for quick, easy access to the filters.

### CHEMICAL MEDIA SECTION

This section houses the Unisorb Canada chemical media as selected to suit the specific contaminant control application. VBS units are designed for bulk loading of chemical media through the top of the unit. Hatch access is on the top of the unit through quick release, snap acting type, positive pressure latches for immediate access. Gravity unloading is normally accomplished through the media section door on the side of the unit. Vacuum unloader fittings are available for these doors to assist in fast efficient media removal without operator contact when required.

Media sample ports are provided on each system to assist in retrieving media for analysis.

Optional media bed monitors are installed in this section when required to assist in monitoring and tracking the rate of progression of H<sub>2</sub>S contaminants through the chemical media bed. This option is useful for the prediction of H<sub>2</sub>S contaminant breakthrough for such systems.

Gravity hopper unloading with a dump valve is available when required. In such cases, the system is provided with an elevated stand to allow access under the hopper.

### FINAL-FILTER SECTION

This section provides particulate filtration to remove any fine dust, which may be released from the system during media change-out, or initial start-up of the system. The 2" deep - 35% MERV 8 filter for dust control to the atmosphere or optional high efficiency 6" deep - 95% MERV 14 final-filter is used for the retention of fine particulates to protect the downstream air space for corrosion protection applications.

Extruded stainless steel filter tracks with are used to prevent air from bypassing around the filters.

A magnehelic differential pressure gauge is used to locally monitor the pressure drop across the filter section to determine when the changeout of filters is necessary. An optional photohelic differential pressure gauge/switch is used when a set of contacts is required to provide local monitoring and to send an alarm signal to a remote location to indicate when the filters need to be checked or changed. A side access door with quick release, snap acting type, positive pressure latches is used for quick, easy access to the filters.

### **BLOWER SECTION**

This section contains the blower, motor, and belt drive components to move the appropriate quantity of air through the system. The blower system is designed to overcome the static pressure losses involved with the air purification systems, and the external loses. The components are selected to provide reliability for continuous 24 hour, 365 days per year operation in a contaminated environment.

Corrosion resistant pressure blowers are used for most applications. Radial or backward inclined bladed centrifugal blowers are selected for each unique application to ensure an operating point, which will allow flexibility for field adjustments should the operating parameters change. Scroll drains, belt guards, and shaft guards are standard on all exposed fan systems. The blower is typically isolated from the remainder of the system for vibration, and acoustic purposes.

Where spark proof or special corrosion resistant construction is required, they will be provided.

Standard motors are TEFC. Special explosion proof construction features are available as required to suit field requirements.

The standard unit comes ready for field wiring connections to the electrical box on the motor. Starters, disconnects, controls, and panel lights are all available as required.

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### STANDARD CONSTRUCTION

- + 14-Gauge Welded Stainless Steel
- + 2" Deep - 35% MERV 8 Pre-Filter
- + 6" Deep - 95% MERV 14 Final-Filter
- + Structural Steel Base (Epoxy Coated)
- + Doors Sealed With - Closed Cell Neoprene Gasketing
- + ¼ Turn Snap Acting Positive Pressure Latches
- + Blower - TEFC Motor
- + Single Media Bed
- + Media Sample Port
- + Magnehelic Gauges for Pre-Filter & Final-Filter Sections

### OPTIONS

- 16-Gauge SS
- Other Material - Contact Unisorb
- Double Wall Construction
- Multiple Stacked Medias
- Intake Louver with Birdscreen
- Intake Hood with Birdscreen
- Mist and Grease Elimination Pre-Filter
- Summer/Winter Pre-filter Heater
- Preheat Coil
- Cooling or Dehumidification
- Media Bed Vacuum Unloader(s)
- Media Bed Monitor
- Gravity Hopper Unloader with Dump Valve
- Photohelic Differential Pressure Gauges
- NEMA Rated Control Panel, Starter, and Disconnect
- Explosion Proof Blower Motor
- Spark Proof Blower Construction
- Redundant Fans
- Discharge Silencer
- Other \_\_\_\_\_

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### VBS SELECTION GUIDE

VBS Model No.	Air Flow Range (CFM)	Motor Range (HP)	Media Volume (FT3) *	Shipping Weight Empty (LBS)	Operating Weight (LBS) *
202	150-400	1-1.5	12	585	1185
302	240-600	1.5-3	18	655	1555
402	480-800	1.5-3	24	730	1930
403	720-1200	3-5	36	815	2615
404	960-1600	5-7.5	48	905	3305
504	1200-2000	5-7.5	60	955	3955
604	1440-2400	7.5-10	72	1080	4680
605	1800-3000	7.5-10	90	1185	5685
606	2160-3600	7.5-10	108	1295	6695
706	2520-4200	10-15	126	1395	7695
608	2880-4800	10-15	144	1505	8705
708	3360-5600	10-15	168	1625	10025
808	3840-6400	10-15	192	1760	11360
809	4320-7200	15-20	216	1950	12750
810	4800-8000	15-20	240	2150	13760

\*Media Volume and Operating Weights based on typical 3 ft. deep media bed

## SPECIFICATIONS

### 1.0 PURPOSE

A Unisorb Canada VBS vertical deep bed air purification system is to be provided for this application. The system shall be a complete package designed for the removal of all organic and inorganic vapors or gases. The system shall ensure no bypass of contaminants and shall provide a minimum 99.9% removal efficiency of constituent contaminants.

### 2.0 DESIGN

- 2.1 The manufacturer shall have a minimum of 5 years of history in design, fabrication, and testing of similar air purification systems. The system shall provide a minimum airflow capacity as outlined in the specification parameters.
- 2.2 The air purification system shall have pre-filters, a chemical media bed, final-filters, and a blower section to suit the specific requirements.
- 2.3 The system shall be configured either in a Blow-thru or Draw-thru configuration as suited to the application.
- 2.4 The manufacturer shall guarantee a minimum life expectancy for the system according to the inlet and outlet contaminant levels for this application. Discharge contaminant levels shall not exceed defined parameters at any time before media expiry.
- 2.5 The manufacturer shall have the capability of providing in house laboratory analysis for testing media to assist in determining media bed consumption rates.
- 2.6 Where corrosion control is involved, the equipment manufacturer shall provide corrosion monitoring assistance for the controlled space. In house support and analysis of corrosion coupons shall be provided by the equipment manufacturer.
- 2.7 The chemical media shall have the capability of being unloaded by gravity flow through a hinged unloading door or a vacuum unloader at the bottom side of the media section. Loading shall be accomplished through the removable hatch on top of the unit.
- 2.8 The media beds shall be designed to have a means of obtaining a media.

### 3.0 CONSTRUCTION AND FABRICATION

- 3.1 The base frame shall be epoxy coated mild steel channel.
- 3.2 The unit casing shall be welded with similar metals. Any dissimilar metals shall be fastened together by mechanical fasteners.
- 3.3 To produce high quality low distortion welds, the GTAW (TIG) welding process shall be used.
- 3.4 All access doors and hatches shall use closed cell neoprene gasketing to prevent any air leakage.
- 3.5 All gasket material shall be ¼" thick by ¾" wide-open cell neoprene foam.
- 3.6 Service doors and all unit access shall be oriented to suit field conditions or requirements.
- 3.7 Hinges shall be of continuous piano type pin, and constructed of 300 series stainless steel. Doors shall be held closed with quick release, snap acting type, positive pressure latches.

### 4.0 INTAKE & PRE-FILTER SECTION

- 4.1 The intake section shall take into consideration any intake hoods, louvers, birdscreens, flanges, and pre-filters to prevent the passage of rain, snow, or particulates into the downstream sections of the air purification system.
- 4.2 Any preheating, cooling, or humidification necessary to temper the incoming air stream shall be provided by the equipment manufacturer.
- 4.3 The pre-filter section shall include a 35% MERV 8 roughing pre-filter, based on ASHRAE Standard 52.1, and shall carry Class 2 certification in accordance with UL Standard 900. Optional 95% MERV 14 after filter is available.
- 4.4 Filter face velocities and filter resistances shall not exceed the allowances for the project.
- 4.5 Any mist elimination and grease pre-filter systems shall be provided when required. A permanent 3-stage side access ultra-high efficiency 99.9% 2-micron Mist in an efficient coalescing manner without flooding or carry over and grease eliminator system with 1½" MNPT drain.
- 4.6 Extruded stainless steel particulate filter tracks seals shall be used to allow easy changing of the filters, and to ensure air does not bypass the filters.
- 4.7 Access doors to the filters shall be with quick release, snap acting type, positive pressure latches.
- 4.8 The pre-filter section shall be monitored by a magnehelic differential pressure gauge or a photohelic pressure switch/gauge.

### 5.0 CHEMICAL MEDIA

- 5.1 The chemical media shall be as selected for this application with minimum performance and physical characteristics as defined for this application. Media data sheets, current SDS information and original samples are to be provided by the manufacturer.
- 5.2 The media bed depth, bed volume, and residence time shall meet or exceed the minimum requirements.
- 5.3 Media bed face velocity shall not exceed the specified rate for this application.
- 5.4 Media pressure losses shall not exceed the design limitations.
- 5.5 The chemical media shall have the capability of being unloaded by gravity flow through a hinged unloading door or a vacuum unloader at the bottom side of the media section. Media loading shall be accomplished through the removable hatch on top of the unit.
- 5.6 The media bed shall be designed to have a means of obtaining a media and air sample.

### 6.0 FINAL-FILTERS

- 6.1 The particulate final-filter section shall include a 95% MERV 14 high efficiency after filter based on ASHRAE Standard 52.1, and shall carry Class 2 certification in accordance with UL Standard 900.
- 6.2 Filter face velocities and filter resistances shall not exceed the allowances for the project.
- 6.3 Access doors to the filters shall use quick release; snap acting type, positive pressure latches.
- 6.4 The final-filter section shall monitor the pressure drop by a magnehelic differential pressure gauge or a photohelic pressure switch/gauge.

### 7.0 BLOWER SECTION

- 7.1 Standard blower arrangement shall be configured for a Draw-thru or Blow-thru application. The blower shall be an industrial centrifugal type of suitable corrosion resistance construction. Bearings shall be based on L10 minimum life of 40,000 hours of average life of 200,000 hours. Adjustable motor base shall have a two-point leveling and tension adjustment.
- 7.2 The blower assembly shall be installed utilizing isolation mounts for vibration purposes.
- 7.3 Sheaves shall be sized for a minimum of 150% of motor horsepower, fully machined, cast iron, keyed and securely attached to the shaft. The blower shall be driven using a heavy industrial adjustable V-belt assembly which is oil and heat resistant and non-static conducting.
- 7.4 The blower section shall have accessibility for maintenance purposes, including balancing, grease nipples, tachometer (RPM) opening, and scroll drain.
- 7.5 Shaft and belt guards shall be provided for personnel safety.
- 7.6 Optional spark proof blower construction shall be provided for such rated environments.
- 7.7 The motor shall be totally enclosed fan cooled (T.E.F.C.) type rated for the intended duty cycle.
- 7.8 Optional explosion proof motor construction shall be provided for such rated environments.
- 7.9 Optional disconnect, starter, and controls shall be provided as required to suit the application.

### 8.0 PACKAGING & HANDLING

- 8.1 The air purification system shall be capable of preventing any deflection during rigging, handling, transportation, operation, or servicing.
- 8.2 Lifting lugs and/or anchor bolt locations shall be provided for safe handling and operation of the system.