

**Appendix E**  
**Vac-Pac® High Performance H.E.P.A Vacuum /**  
**Drumming System specifications**

# VAC-PAC®

from Pentek

## High Performance H.E.P.A Vacuum / Drumming Systems

These portable, high performance vacuum systems are uniquely designed to support Pentek's line of dustless surface decontamination equipment: MOOSE™, SQUIRREL®-III, and CORNER CUTTER®. VAC-PAC® technology has also found industrial application in support of other vacuum and dust-collection operations designed to ensure environmental protection and occupational health and safety in the workplace.

The standard VAC-PAC® design offers two-stage positive filtration of hazardous particulates, including radioactivity, toxic chemicals and lead-based paint. First stage efficiency is 95% at 1 micron; second stage HEPA efficiency is 99.97% at 0.3 microns. First stage design offers *automatic self-cleaning* by reverse-flow pulses of high pressure air. This feature substantially reduces the need for routine filter maintenance; recommended replacement is at annual intervals. Even extremely fine powders such as portland cement can be vacuumed on a continuous basis without interruption. VAC-PAC® reliability is high, as the system is designed with virtually *no moving parts!*

All VAC-PAC® systems feature compact, high efficiency pneumatic eductors or electric vacuum generators. Compared to competitive systems, this results in a more efficient consumption of power and an *increase in usable vacuum flow of over 400%* over a typical working range of vacuum between 15 and 60 in. W.G. (see further discussion on next page). VAC-PAC® offers performance capabilities typically found only in expensive truck-mounted "super vacuums," but at a fraction of the investment!

Also featured in the VAC-PAC® design is Pentek's patented *controlled-seal drum fill system* which allows the operator to fill, seal, remove, and replace the waste drum under controlled vacuum conditions. This assures positive control of waste and dust, and minimizes the possibility of releasing airborne contamination during drum changing operations. Users will find that accidental operator contact with the waste, contamination of external waste drum surfaces, and the need for respiratory protection for operating personnel is also minimized.

Waste remains stationary at all times, as the VAC-PAC® is safely and conveniently positioned above palletized or drawer-supported waste drums. Full, sealed wasted drums are immediately ready for further handling activities.

Standard 55-gallon (U.S.) drums can be accommodated by all models. Special 23-gallon drums are available which can be placed inside standard 55-gallon, D.O.T. 17-H overpacks for later compaction, transport, and burial. Interfaces to other drum sizes and waste containers can be engineered and fabricated to meet customer specific needs.

Other exclusive VAC-PAC® features include:

- ◆ Automatic, full-drum level alarm.
- ◆ Multiple nozzles for simultaneous operation of several hoses.
- ◆ High flow capacities to operate with hoses up to 200 feet long.
- ◆ Compact design will roll through doorways.



VAC-PAC® waste drums are filled and sealed under controlled vacuum.



The VAC-PAC® is easily transported and provides multiple ports for multiple tool operation.



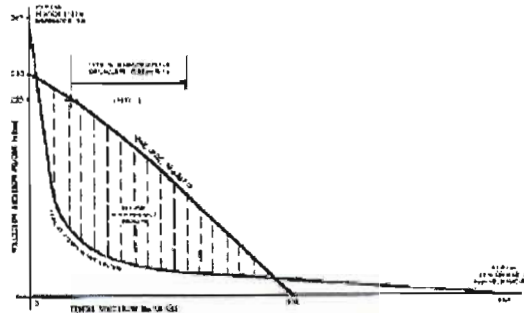
Electric-powered VAC-PACs® offer optional drawer-mounted waste drums for system portability.

# VAC-PAC<sup>®</sup> HEPA-Filtered Vacuums for Radioactivity, PCBs, Lead-Based Paint, Asbestos, Silica Sand, and other Hazardous Particulates

**SPECIFICATIONS:** This data is provided for quick comparison of the various specifications and performance capabilities of each of the standard VAC-PAC<sup>®</sup> models. Please consult our engineering department to determine if we can provide any custom modification to meet your specific requirements.

	Air-Powered							Electric-Powered		
	Model 6	Model 9	Model 12	Model 15	Model 18	Model 21	Model 24	Model 10	Model 13	Model 22
• Rated Vacuum Flow (cfm) [Note 1]	150	225	300	375	450	525	600	250	325	550
• Air Consumption @ 85 psig (scfm)	70	105	140	175	210	245	280	Not Applicable		
• Rated Motor HP	Not Applicable							5	7.5	15
• Rated Static Lift (in. W. G.)	100							93	100	102
• Primary Roughing Filter Cartridges	2 @ 8" dia.			3 @ 8" dia.				2 @ 8" dia.		3 @ 8" dia.
• Secondary HEPA Filters	1 @ 12" x 24"							1 @ 12" x 24"		
• Overall Dimensions: LxWxH (inches)	48 x 28 x 72							48x28x72		48x28x84
• Standard Waste Drums (US Gallons) [Note 2]	23 / 52 / 55							23; 52 / 55 optional		
• Approximate Weight (pounds)	750							950	1100	1250

## GRAPHIC DESCRIPTION OF INCREASED PERFORMANCE MARGINS ACHIEVABLE WITH THE VAC-PAC<sup>®</sup>



Most vacuum system vendors rate their equipment on the basis of maximum vacuum flow (e.g., wide-open vacuum source with no system pressure losses), and maximum static lift (vacuum obtained under no-flow conditions.) Operators often incorrectly assume that these systems will provide both high flow and high vacuum capability. Unfortunately, these key performance parameters do not occur at the same point on the operating curve (see BLACK curve in above graph); they only occur at the two extreme ends of the curve. These maximum performance parameters are both mutually exclusive, thereby presenting a trivial characterization of actual vacuum system performance to be expected in operation.

Actual measurements of typical vacuum system performance will show a rapid decrease in vacuum flow as real-world system pressure losses are introduced (e.g., friction and expansion losses due to pick up nozzles, vacuum hoses, primary and secondary filter particulate build up, etc.)

The important conclusion to be obtained from the above discussion is that the key measure of vacuum system performance is the ability to provide the desired vacuum flow at the actual operating vacuum condition. Since vacuum flow is the important parameter which controls the effective entrainment and transport of material, then the vacuum produced by the system under these actual flow conditions must be sufficient to overcome the total system pressure loss (flow resistance) in order to sustain this flow.

The VAC-PAC<sup>®</sup> is uniquely designed to provide substantially higher vacuum flows over the realistic working range of vacuum system pressure (see RED curve above). To the operator, this translates into wide performance margins to ensure uninterrupted operation.

Note 1: All VAC-PAC<sup>®</sup> systems are rated in terms of actual vacuum flow during operations, measured downstream of the HEPA filters.

Note 2: Customer may specify other waste drum size and geometry.



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