



# PHOENIX GUARDIAN HEPA SYSTEM

## HEPA FILTER

PART NUMBER# 4023244

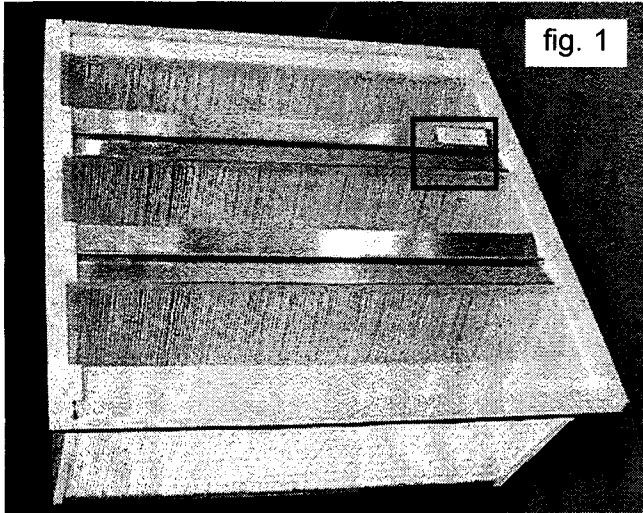


fig. 1

The Phoenix Guardian HEPA filter is a V-bank design with over 170 square feet of HEPA media surface area. The manufacturer labels each filter on the crossbar of one of the V-banks. HEPA filters are 99.97% DOP efficiency filters. This test procedure conforms to UL586 standard for testing DOP filters. The manufacturer tests each filter prior to shipment

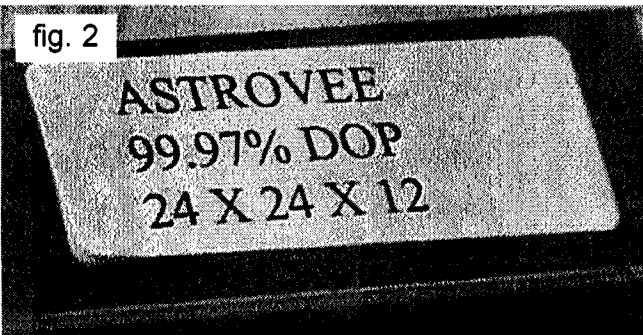


fig. 2

ASTROVEE  
99.97% DOP  
24 X 24 X 12

to Therma-Stor Products. The serial number of the filter and the results of this test are shown on a label affixed to the side of each HEPA filter. (fig.4)



fig. 3

The DOP Penetration test measures the percentage of particles that penetrate the media. A test result of .013% penetration equals 99.987% DOP efficiency. The test airflow is designed to show the minimum

PENETRATION: .013 %  
TEST FLOW: 500 CFM  
SIZE: 24 X 24 X 12  
PART NO: 3007077-1 (333-077-001)

fig. 4

SERIAL NO. **42217209**

efficiency expected. Increasing the airflow will improve rather than reduce the performance of the filter. If the penetration test results are above .030% then the filter does not qualify as a HEPA filter, and it will not receive the 99.97% DOP label.

A quality control label also located on the side of the filter lists several facts including the date of the test and the inspector.

These precautions insure the HEPA filter in your Phoenix Guardian HEPA System meets or exceeds the test requirements for HEPA filters.

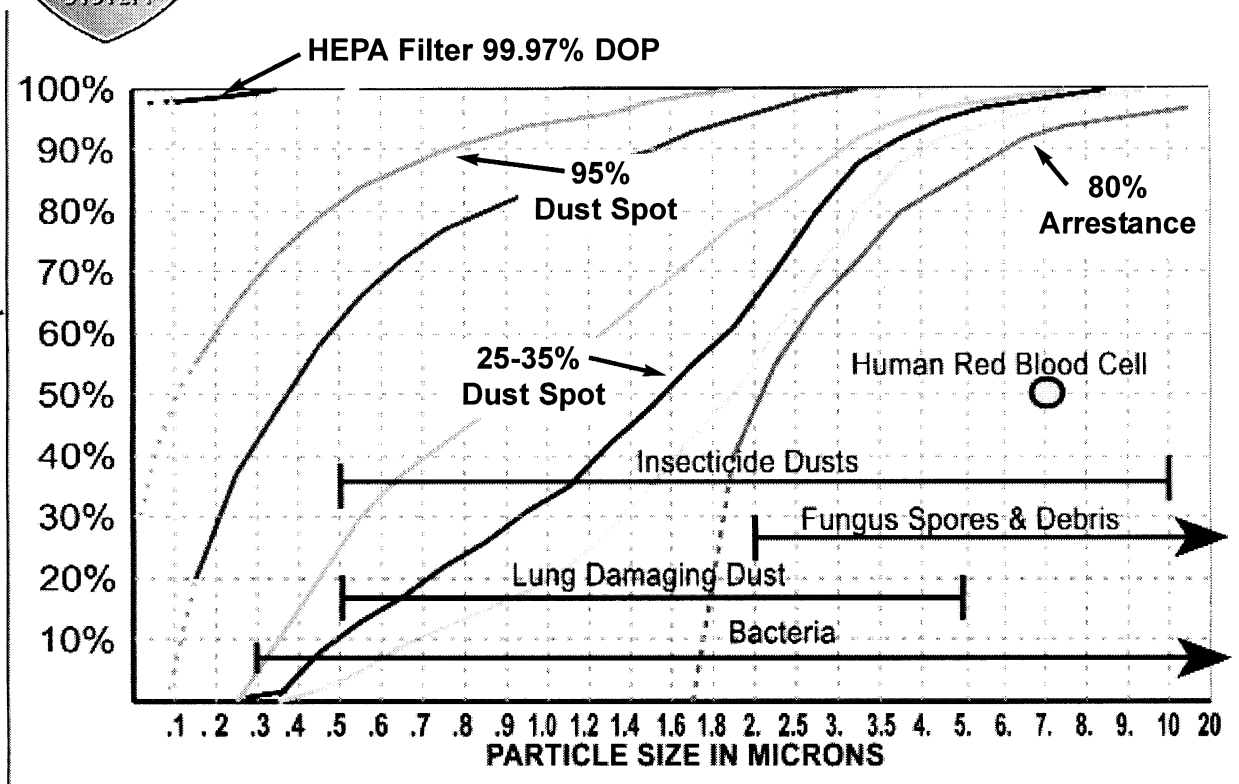
*See reverse side for definitions and terminology.*

## DEFINITIONS & TERMINOLGY





# PHOENIX GUARDIAN HEPA SYSTEM



**HEPA filter:** *High efficiency particulate air filter.* (TERMINOLOGY of Heating, Ventilation, Air Conditioning, and Refrigeration. copyright 1986; American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.)

**DOP Penetration Test:** The test criteria applied to HEPA and ULPA filters in the United States. The Thermal DOP method outlined in the U.S. Military Standard MIL-STD-282 (1956) utilizes DOP which is dioctyl phthalate or bis-phthalat, an oily liquid with a high boiling point. In this method, a smoke cloud of DOP droplets condenses from DOP vapor. The mass median diameter of DOP aerosols is about 0.27 microns. DOP test results are commonly referred to efficiency on 0.3 micron particules. The test measures the percentage of these particles that penetrate the filter. A DOP penetration test result of 0.013% equals an efficiency of 99.987%.

HEPA filters require an efficiency of 99.97% and 99.99% efficiency is required of ULPA filters.

**Arrestance Test:** ASHRAE *Standard 52.1* test calculated on percentage of weights of dusts passing tested device and the total dust fed.

**Atmospheric Dust-Spot Efficiency Test:** ASHRAE *Standard 52.1* test where atmospheric dust is passed through filter paper target and through a cleaning device and then through a filter paper target. These targets are compared and an efficiency rating is assigned.

(2000 ASHRAE *Systems and Equipment Handbook*. copyright 2000; American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.)



**PHOENIX**  
RESTORATION EQUIPMENT

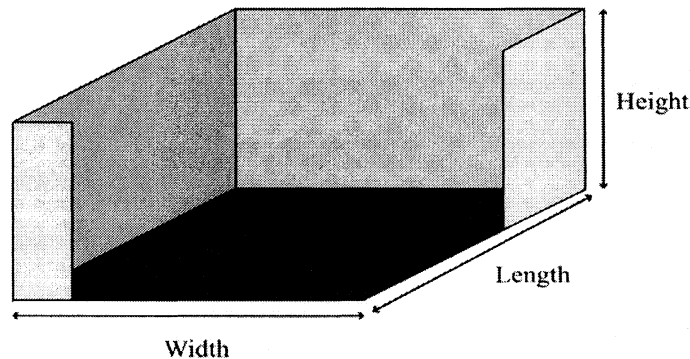


## Sizing Phoenix Guardian HEPA System According to Restoration Industry Standards

**Step 1:** Determine the *Cubic Feet* of the air volume to be scrubbed.

$$\begin{aligned} \text{Cubic Feet of air volume} &= (\text{width}) \times (\text{length}) \times (\text{height}) \\ &= (\text{square footage of area}) \times (\text{height of ceiling}) \end{aligned}$$

### Determining Cubic Feet of Affected Area



**Step 2:** Multiply *Cubic Feet* (from **Step 1** above) by the desired amount of *Air Changes per Hour* to get *Cubic Feet per Hour*.

**The Restoration Industry Standards recommend at least 4 *Air Changes per Hour*.**

$$\text{Cubic Feet per Hour} = (\text{Cubic Feet}) \times (\text{Number of Air Changes per Hour})$$

**Step 3:** Divide *Cubic Feet per Hour* by 60 to get *Cubic Feet per Minute*.

$$\text{Cubic Feet per Minute} = \frac{(\text{Cubic Feet per Hour})}{60 \text{ minutes}}$$

**Step 4:** Determine *Air Scrubber Output* with clean filters.

Air Scrubber	Air Scrubber Output (Actual CFM)
Guardian HEPA System	1400 High Speed 900 Low Speed
Mini-Guardian HEPA System	415 Variable Speed

**Step 5:** Divide *Cubic Feet per Minute* needs by *Air Scrubber Output* to get the *Number of Air Scrubbers Needed*.

$$\text{Number of Air Scrubbers} = \frac{\text{Cubic Feet per Minute}}{\text{Air Scrubber Output}}$$

**Note: The Number of Air Scrubbers needed is always rounded up to the next whole number.**