



The image at left shows a horizontal flow hood. You can see that all sides except the front are enclosed by metal, glass, or plastic sides. Room air is brought in through the opening below, sent through a series of blowers, then routed through the filter in the back of the work area and sent horizontally across the work field.

The filter used is known as a *HEPA* filter. HEPA stands for **H**igh **E**fficiency **P**articulate **A**ir filter. The HEPA filter consists of a thin pleated sheet of boron silicate microfibers with aluminum separators. This filter catches and retains airborne particles and microorganisms. The air coming through is stripped of these impurities and then sent across the work field. Since the incoming air is filtered, and room air is not allowed into the hood, we maintain conditions that are optimal for handling sterile products.

These horizontal units worked great, except for one glaring flaw. With the airflow blowing directly into the operator's face, any drug product which was spilled or aerosolized was blown right into the operator. With the advent of chemotherapy and biological drugs, this exposure was too dangerous.



A new design incorporating a vertical flow of filtered air was developed. These *vertical flow hoods* protect the operator from exposure to the chemicals he is working with. In this design, the HEPA filter delivers air from the top of the unit that is directed straight down on the workspace. Air is then collected from the bottom of the workspace through an inlet duct, refiltered, and reused. Approximately 70% of the air is reused in this manner.

As you can see from the photo, the only space open to the room environment is the bottom eight inches of the front panel. This is necessary to allow the hands of the operator to enter.

Laminar flow hoods used in pharmacy are able to filter particles as small as 0.3 microns in diameter. Their ratings are predicated on how well they do this. A properly operating pharmacy hood should have a HEPA filter which will remove 99.997% of particles 0.3 microns or larger.

Preparation of sterile products should take place in *class 100 conditions*, as defined by federal standards. This standard states that not more than 100 particles per cubic foot may be contained within the hood work area. The only way conditions this stringent can be achieved is through a combined effort of proper cleaning, preparation, and filter maintenance.