contaminants found in false positive sterility-test samples are human borne. Indeed, the single largest contributor of accidental contamination in sterility-test samples results from lack of strict adherence to good aseptic techniques by the person or people conducting the test. False positive sterility tests result also from contaminants located in the environment (air and surfaces, especially if barrier isolators are not used), and/or equipment used in conducting the test (e.g., nonsterile membrane filter assemblies, scissors, forceps, other devices that somehow are contaminated).

ISOLATION STERILITY-TEST UNITS

As previously discussed, false positive sterility tests occur because of inadvertent contamination of the sample in the sterility-test laboratory. Such contaminations are of a finite probability as long as human manipulation is involved. Concerns over such unreliabilities of the sterility test have given rise to new technologies designed to remove as much as possible the human element involved in sterility testing.

The use of hard-walled isolators has become the most recent trend in sterility testing. Isolators are made of polyvinyl chloride supported externally by a framework of stainless-steel rods. The barriers are accessed by the operator through either glove sleeves or half suits. Materials are introduced into and removed from these barriers through a double door transfer port where both sides of the double door are sterilized. Room air enters and exits through a High Efficiency Particulate Air (HEPA) filter system. All sterility-test operations occur within the barrier system.

One of the major aspects of the isolation chamber is the sterilization and its validation of all surfaces within the chamber and product containers and other items brought into the chamber. The original method of surface sterilization was the use of peracetic acid as a spray. The most commonly used method of surface sterilization today is VPHP (vapor phase hydrogen peroxide). The VHP 1000® manufactured by the Steris Corporation (formerly AMSCO) (Fig. 27-3) is widely used in the pharmaceutical industry in conjunction with barrier isolation systems. VPHP is less corrosive to metals such as stainless steel than is peroxyacetic acid.

The advent of isolation chambers and robotic sterility-test systems has challenged the long-held level of acceptability of false positives. The historical generally acceptable level of false positive sterility tests was in the vicinity of 1.0%, although in the past couple of decades,

Figure 27-3 Example of sterility test isolator with vapor phase hydrogen peroxide generator. *Source*: Courtesy of Baxter Healthcare Corporation.