3.4.1 Class I: The Class I BSC provides personnel and environmental protection, but no product protection. It is similar in air movement to a chemical fume hood, but has a HEPA filter in the exhaust system to protect the environment. In the Class I BSC, unfiltered room air is drawn across the work surface. Personnel protection is provided by this inward airflow as long as a minimum velocity of 75 linear feet per minute (lfpm) is maintained through the front opening. Because product protection is provided by the Class II BSCs, general usage of the Class I BSC has declined. However, in many cases, Class I BSCs are used specifically to enclose equipment (e.g., centrifuges, harvesting equipment or small fermenters), or procedures with potential to generate aerosols (e.g. cage dumping, culture aeration or tissue homogenation).

The classical Class I BSC is not equipped with an integral exhaust fan and must be direct connected to the building exhaust system, and the building exhaust fan provides the negative pressure necessary to draw room air into the cabinet. Cabinet air is drawn through a HEPA filter as it enters the cabinet exhaust plenum. A second HEPA filter may be installed in the terminal end of the building exhaust prior to the exhaust fan.

Some Class I BSCs are equipped with an integral exhaust fan and a HEPA filter in the exhaust plenum. If the BSC is connected to the building's exhaust system it shall be canopyed connected. The cabinet exhaust fan must be interlocked with the building exhaust fan. In the event that the building exhaust fan fails, the cabinet exhaust fan must turn off so that the building exhaust ducts are not pressurized. If the exhaust ducts are pressurized and the HEPA filter has developed a leak, then contaminated air could be discharged into other parts of the building or the environment. Note that cabinets with an auxiliary air supply opening a filter should have a filter be installed on the cabinet air supply intake. The use of two filters in the cabinet increases the static pressure on the fan.

A panel with openings to allow access for the hands and arms to the work surface can be added to the Class I cabinet. The restricted opening results in increased inward air velocity, increasing worker protection. For added safety, arm-length gloves can be attached to the panel. Makeup air is then drawn through an auxiliary air supply opening (which may contain a filter) and/or around a loose-fitting front panel.

Some Class I models used for animal cage changing are designed to allow recirculation of air into the room after HEPA filtration and may require more frequent filter replacement due to filter loading and odor from organic materials captured on the filter. The re-circulating Class I BSC should be annually certified for sufficient airflow and filter integrity.

A ventilated cabinet for personnel and environmental protection, having an un-recirculated inward airflow away from the operator that exhausts all air to the atmosphere after filtration through a HEPA filter. Class I cabinets are suitable for work where no product protection is required.

NOTE—Although the traditional Class I BSC is exhausted to the atmosphere without recirculation into the lab, it is recognized that some of the benefits of the Class I BSC can be obtained even when the unit’s HEPA filtered exhaust is vented back into the laboratory.