(c) *Prohibitions.* More than minute amounts of flammables must not be used in these cabinets.

(d) *Certifications and requirements.* (1) These cabinets will have a manometer or magnehelic gauge that indicates the negative pressure that is maintained inside the cabinet. The pressure inside the cabinet should be a minimum of 0.5 inches water gauge negative to the surrounding room.

(2) These cabinets will be pressure tested by the soap bubble or halogen leak test as prescribed in NSF Standard No. 49, appendix B1 (latest revision, June 1987), and certified, when the HEPA filter units are serviced.

§627.53 Fume hood.

Fume hoods in which etiologic agents are handled must use proven technologies to provide optimal containment. Fume hood placement, design, and capture testing requirements for use in designing new laboratories can be found in the latest edition of Industrial Ventilation, A Manual of Recommended Practices, published by the American Conference of Governmental Industrial Hygienists.

(a) *Description.* Fume hoods are common chemical laboratory furnishings designed to capture fumes from chemicals that are used within them. Air is drawn through the opening and vented to the exterior without recirculation.

(b) *Uses.* Fume hoods provide excellent containment for handling hazardous chemicals.

(c) *Prohibitions.* Moderate risk biologicals and open containers of dry forms of toxins must not be used in a fume hood without HEPA filtration. Fume hoods should never be used when sterility is required.

(d) *Certification and requirements.* (1) Inward air flow will be an average of 100 plus or minus 20 lfpm as measured at the face of the fume hood. Proper function of laboratory hoods is not only a function of face velocity. An evaluation of the total operating environment is necessary.

(2) When filters are required, they will be certified by the mineral oil droplet (HEPA) or Freon (Charcoal) leak test as appropriate. Leakage through the filters will be less than 0.05 percent for Freon and 0.03 percent for oil droplets when initially installed.

(3) Fume hoods will be provided with indicator devices to give a warning should the ventilation system fail or if the hood face velocity falls below an average of 80 lfpm

(4) Hood air flow will be certified when installed, when maintenance is performed on the ventilation system, and semiannually thereafter.

§627.54 Glove box.

(a) *Description.* A glove box is an enclosure that provides a positive barrier from liquids, solids, and chemical vapors. A glove box has viewing ports and glove ports for access. The box maintains personnel protection through solid barriers and maintenance of a negative pressure relative to its surroundings.

(b) *Uses.* Glove boxes are used when extreme containment is needed for highly toxic chemicals, especially for dry chemicals that can be swept out of containers by the airflow in hoods.

(c) *Prohibitions.* Unventilated boxes must not be used with volatile flammable materials and should be used with volatile toxic materials unless dilution ventilation is provided.

(d) *Additional certifications and requirements.* (1) The glove box will be maintained at a pressure of at least 0.25 inches water guage less than its surroundings.

(2) The pressure differential will be indicated by a manometer or magnehelic guage. Indicator devices will display a loss of pressure below 0.25 inches water guage.

(3) Gloves will be changed at appropriate intervals (dependent on the box contents) to ensure they provide the protection needed.

(4) Inlets that provide dilution air will be protected by HEPA filters.

§627.55 Ventilated balance enclosures.

(a) *Description.* A ventilated balance enclosure is a box that surrounds a balance and has a small open area for access and handling material in the front. Air is exhausted out the rear of the enclosure.

(b) *Uses.* A ventilated balance enclosure is used when containment of a balance is required to weigh hazardous

materials that have a low vapor pressure (such as toxins). These enclosures are also used when it is best to use the balance in other than a fume hood (due to the turbulence and vibration) and when biological safety cabinets or glove boxes are inappropriate or unavailable. Dry forms of toxins may be weighed in these enclosures.

(c) *Prohibitions.* Very volatile or highly toxic volatile materials must not be handled in ventilated balance enclosures unless they are placed in closed containers in a properly functioning fume hood before being transferred to the balance enclosure.

(d) *Additional certifications or requirements.* (1) The flow through the openings in the enclosure will be at least 60 lfpm and must average between 60 and 80 lfpm.

(2) Containment will be certified prior to first use and annually thereafter by smoke tubes.

(3) The air flow will be certified initially and semiannually by averaging readings taken from the face of the opening.

§ 627.56 Ventilated cage enclosures.

There are a number of cage-ventilated enclosures in which infected animals may be housed at levels corresponding to the various classes of biological safety cabinets. A brief description of four different types of animal ventilated cages is given below. This is not a complete description of all the different animal ventilated cages available. The proper functioning of these will be tested initially, upon each connection to exhaust sources, and at least annually. The inward flow rates on the partial containment systems and pressure checks on the total containment cages will be performed. Prior to selecting such equipment, an evaluation of the function and the equipment should be made, and the methods for testing and decontamination should be analyzed and documented.

(a) *Filter-top cages.* Small laboratory animal polystyrene or polycarbonate cage bottoms are fitted with a dome shaped glass fiber or polyester filter cage cover. The dome shaped filters help reduce the dissemination of aerosols, and the spread of infectious agents. Adequate ventilation around cages fitted with a dome shaped filter is essential since they may contain elevated ammonia and carbon dioxide levels, and high temperature and humidity. Ventilation recommendations in the NIH publication 86–23, 1985 ''Guide for the Care and Use of Laboratory Animals'' will be followed.

(b) *Forced ventilation cages.* This is a small HEPA-filtered cage connected to a centralized exhaust system. A minimum airflow of 0.03 m^3/min per cage is required. Ventilation rates may vary with the size of the cage, and the number and type of animals being housed.

(c) *Cubicle-type isolation cage.* This is a partial containment unit which holds several animal cages. This unit is a negative pressure HEPA-filtered stainless steel cage. A minimum airflow of 0.3 m^3/min per cage is required for a 0.24 m^3 unit. Ventilation rates may vary with the size of the cage and the number and type of animals being housed.

(d) *Total containment cage.* This unit is a negative pressure or positive pressure HEPA-filtered stainless steel cage which has the filters incorporated into the design. It is halogen gas-leak tight and can be considered a Class III biological safety cabinet. A minimum airflow of 0.3 m^3/min per cage is required for a 0.24 m^3 unit. Ventilation rates may vary with the size of the cage, and the number and type of animals being housed.

§ 627.57 Ventilated cage areas.

Ventilated cage areas within a room that are solid-walled and bottomed areas for containing multiple cages housing infected animals. The containment for these areas is equivalent to the Class I biological safety cabinet. For testing purposes, they will be treated the same as a Class I biological safety cabinet.

APPENDIX A TO PART 627—REFERENCES

Publications referenced in this part can be obtained from the National Technical Information Services, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.