

### ANIMAL FACILITIES

#### GENERAL

The following supplemental guidelines apply to indoor animal facilities, intended for research, and override the related Campus Design Guide (CDG). Animal rooms, vivaria and animal holding areas shall comply with the Guide for the Care and Use of Laboratory Animals (most current edition). All drawings and specifications for animal rooms, vivaria and animal holding areas shall be reviewed by the attending Veterinarian and the IACUC Administrator.

The design for outdoor agricultural animal facilities shall comply with the Guideline for the Care and Use of Agricultural Animals used in research and teaching. Wastewater management and runoff from these facilities is detailed in Division 22.

#### CONSTRUCTION REQUIREMENTS

Building materials shall be selected to facilitate efficient and hygienic operation of animal facilities. Durable, moisture-proof, fire-resistant, seamless materials are required. Surfaces shall be impervious to the effects of cleaning agents, scrubbing, high-pressure water, and impact. Wall finishes, paints, and glazes used on surfaces that might come in contact with animals shall be non-toxic. Hand washing facilities shall be provided at exits from animal housing areas and in other areas of an animal housing facility as determined in consultation with the Campus Veterinarian. Telephone shall be provided, accessible (not in a locked office or break room) to users of the animal facility.

#### CORRIDORS

Corridors shall be wide enough to facilitate the movement of personnel, equipment and animals. A 6-8 foot corridor width can accommodate the needs of most facilities.

Wherever possible, water lines, drainpipes, electric-service connections, and other utilities should be accessible through access panels or chases in corridors outside the animals' rooms. Fire/smoke alarms, fire extinguishers, and telephones shall be recessed or installed high enough to prevent damage from the movement of large equipment.

#### DOORS

For safety, doors should open into animal room and be equipped with recessed or shielded handles, sweeps, and optional kick-plates. Doors shall be constructed of 316 mil finish stainless steel or FRP (see CSDG, Specialty Doors and Frames). Doors shall fit snugly within their frames and both doors and frames shall be sealed to prevent vermin entry or harborage. Door frames shall be large enough to accommodate racks and equipment (approximately 42 X 84 inches, minimum), and constructed of stainless steel. Doors with stainless steel vision lites are optimum. Doors are to be designed to be opened from the inside without using a key (see CSDG, Hardware, Recommended Lockset Functions).

## **APPENDIX C**

### **Animal Facilities**

#### **FLOORS**

Floors shall be monolithic and moisture-resistant, non-absorbent, impact-resistant, and relatively smooth. Textured surfaces may be required in high-moisture areas and for some species. Floors shall be resistant to the action of urine and other biologic materials and to the adverse effects of hot water and cleaning agents. Floors shall be capable of supporting racks, equipment, and stored items without damage. Satisfactory materials include epoxy aggregates, hard-surface sealed concrete, and special hardened rubber-base aggregates. Sills at the entrance to a room shall be designed to allow convenient passage of equipment. Not all animal rooms require floor drains. For example, high biosecurity rooms such as transgenic mouse breeding rooms and some biosafety areas shall not have floor drains. Consult the University's Representative for more information. Floors shall be sloped to floor drains. Drainpipes should be at least 4 inches in diameter and grates shall be stainless steel.

#### **WALLS**

Walls shall be smooth, moisture-resistant, non-absorbent and resistant to damage from impact. Surface materials/coatings shall be capable of withstanding cleaning with detergents and disinfectants and the impact of high pressure water. Walls shall be free of cracks and unsealed utility penetrations. Connections with ceilings, floors, corners, and door frames shall be sealed and radiused for ease of cleaning. Hallway curbs, guardrails, bumpers, or corner guards shall be used, as applicable, to protect walls and corners from damage.

#### **CEILINGS**

Ceilings shall be smooth, moisture-resistant and surface coatings shall be capable of withstanding cleaning with detergents and disinfectants. Connections with walls shall be sealed and radiused for ease of cleaning. Plaster or fire-proof plasterboard shall be sealed and finished with a washable paint. Ceilings formed by the concrete floor above are satisfactory (though not optimum), if smooth, sealed or painted. Suspended ceilings are acceptable in hallways, only if they are fabricated of impervious materials and free of imperfect junctions. Exposed plumbing, ductwork, and light fixtures are not permitted. Otherwise, ceilings in animal rooms shall be solid.

#### **STORAGE AREAS AND WORKER BREAK AREAS**

Adequate space for storage of equipment, supplies, food, bedding, and refuse shall be provided. Corridors are not appropriate storage areas. Refuse storage areas shall be separated from other storage areas. Refrigerated storage (below 44.6F), separated from other cold storage, is essential for storage of dead animals and animal tissue waste.

A designated area for workers to eat and drink shall be provided close to, but outside of the animal facility.

Shower and changing facilities should be provided. Design professionals shall consult the University's Representative who shall coordinate with the Campus Veterinarian and/or the Associate Director of Teaching and Research Animal Care Services to determine the need for shower and changing facilities.

## **CONTROLS AND MONITORING FOR ANIMAL ROOMS**

### **HEATING, VENTILATION AND AIR CONDITIONING SYSTEM (HVAC)**

Ventilation systems serving animal housing should be dedicated to the animal housing and not co-mingled with laboratory or office ventilation systems. Air supplied to the animal housing shall be 100 percent outside air and exhausted directly to the outside of the building. Vivarium air shall not be returned back to the building and exhaust discharge shall be sited away from fresh air intakes to prevent re-entrainment.

In some instances, high-efficiency particulate air (HEPA) filters are recommended for air supplied to animal-holding, procedural, and surgical facilities. Also, consideration should be given to the regulation of air-pressure differentials in surgical, procedural, housing, and service areas. As a general rule, areas for general animal housing, located in a mixed use building, should be kept under relative negative pressure, with respect to the rest of the building. For areas for quarantine, housing, and use of animals exposed to hazardous materials and for housing nonhuman primates, the negative pressure differential is particularly important. Work with these animals should be carried out in a biological safety cabinet, as primary containment. Areas for surgery, for clean-equipment storage, and for housing pathogen-free animals may need to be kept under relative positive pressure with clean air. Provide a visual indicator of room pressurization.

Valves controlling reheat coils shall fail in the closed position. Steam coils are not acceptable unless they are equipped with a high temperature cut-off system to prevent space overheating.

### **AIR CHANGE RATE**

Air change rate for secondary enclosures (vivaria) shall be 10-15 fresh air changes per hour. For individually ventilated cages, exhaust air from those cages shall be ducted directly to the outside of the building and not re-circulated back into the vivarium. For animal rooms containing hard ducted, individually ventilated cages, variable air flow rates are acceptable if controlled by an environmental monitoring system.

### **ROOM TEMPERATURE CONTROLS**

Each animal room shall be furnished with two room temperature sensors. One sensor shall be connected to central campus EMS. The second sensor will report to a remote, 24/7, building monitoring system (campus environmental alarms system). Temperature sensors shall be in the exhaust air duct. No conventional room thermostats are allowed.

Relative humidity should also be controlled, but not nearly as narrowly as temperature; the acceptable range of relative humidity is 30 percent-70 percent. Requirements for humidity control should be evaluated on a project by project basis.

### **EMERGENCY POWER**

The animal rooms shall maintain a specified design ventilation rate and temperature at all times. Emergency power is required for the animal room HVAC system including supply air, exhaust air, room cooling, room heating, and individually ventilated cage racks. Temperature control system will also be on emergency power.

## APPENDIX C

### Animal Facilities

#### LIGHTING AND LIGHTING CONTROLS

Light can affect the physiology, morphology, and behavior of various animals. Lighting shall be diffused throughout an animal holding area and provide sufficient illumination for the well-being of the animals and to allow good housekeeping practices, adequate inspection of animals – including the bottom-most cages in racks – and safe working conditions for personnel.

Light levels of 130-325 lux (12-30 ft-candles) 3 feet above the floor are sufficient for animal care and do not cause clinical signs of phototoxic retinopathy in albino rats. Specific animal species may have more stringent lighting requirements.

Lighting controls will be provided to control illumination for animal housing and proper illumination for safe working conditions for animal care workers.

Light cycle shall be controlled by a programmable timer. In addition, a second switch with a timer will be provided to increase illumination for animal care workers.

Back-up for the animal room lighting system shall be evaluated on a project by project basis. Coordinate with the project's University's Representative for the specific requirement.

Light fixtures shall be water resistant to facilitate room disinfection. Consideration should be given to access fixtures from outside animal quarters.

#### ALARMS

Fire alarms should not be installed in individual animal rooms, unless required by the Fire Marshal. Otherwise, fire alarms installed in animal facilities should use strobes rather than audible alarms. Audible alarms can be dangerous to the health and well-being of animals.

Animal Room HVAC System: Alarms shall report to EMS and campus environmental alarms system (24/7).

Power Failure: A signal from the generator or the automatic transfer switch shall be interfaced with the campus environmental alarms system (24/7). A signal from the generator or the automatic transfer switch will be interfaced with the Energy Management System to inform it that the building is on emergency power.

Access Control: Programmable card key access to animal facilities shall be provided.

Security: The level of security measures required shall be based on the animal species and agents in use. Design professional shall consult with University's Representative to seek campus Police and campus EH&S input.

Special Alarms: Some animal facilities may require additional alarm monitoring (refrigerators, freezers, specialized equipment, etc). Consult with University's Representative for input.