Issue 03
March 2012
Division of Technical Resources
Office of Research Facilities
National Institutes of Health
Technical News BULLETIN

Part III: HVAC & MEP Additions to 'The Guide' 8th Edition

HVAC/MEP Features to Note in the 'The Guide'

HVAC and MEP design have a significant effect on animal environmental and housing needs in the Guide:

- Micro and macro environment are defined.
- Information is added on the use of individually ventilated cages and how this affects maintenance, cage sanitation and increased housing densities.
- Effect of temperature, humidity (RH), and concentrations of gases and particulate matter on the micro and macro environments is presented.
- Note that animals should be housed within temperature ranges appropriate for the species to avoid behavioral, physiologic, and morphologic changes, which might negatively affect animal well-being and research performance.
- NEW-recommended temperature for common lab animals i.e. minimum environmental temperature for mouse, rat, hamster, gerbil, guinea pig have increased from 64-79°F to 68-79°F or (18-26°C to 20-26°C).
- NEW-guidance is provided regarding RH i.e. 30-70% RH is appropriate for most mammals. Some species may require higher RH (e.g., some non-human primates, tropical reptiles, and amphibians).

New information regarding HVAC design includes:

- Avoid direct exposure of animals to air moving at high velocity (drafts).
- Variable air volume (VAV) systems allow ventilation rates to be set in accordance with heat load and other variables and may offer design and operational advantages, with respect to flexibility and energy conservation.
- If ventilated caging prevents contamination via adequate filtration, air may be returned to the housing room.
- Specifications for filtering recycled air are added. The types of risks for recycling animal room air are stipulated. Higher efficiency filters (e.g., HEPA) may be beneficial for recirculated supply air and air supplied to or exhausted from specialized areas such as surgical and containment facilities.
- Mechanical components of sanitation equipment cage/rack washers) should be evaluated regularly.
- Section on Aquatic species (Part IV of series) is added.
- Space pressure gradient control is discussed; energy conservation is noted as an important consideration.
- 10-15 fresh air changes per hour (ACH) in animal housing rooms is recommended to maintain macro environmental air quality by constant volume systems but should be examined in light of other housing and species criteria for adequacy and energy conservation.
- Temperature is best regulated by having thermostatic control for each holding space.
- NEW-Information on air intake locations, system exhaust, filtering of supply air in specialized areas to avoid entrainment.

The type and efficiency of supply and exhaust air treatment should be matched to the quantity and types of contaminants to the risks they pose.

New information regarding MEP design includes:

- Examples of critical systems that need electrical back-up such as the HVAC system, ventilated caging systems[1], or life support systems for aquatic species or support functions (e.g., freezers and isolators) in animal rooms, operating suites, and other essential areas.
- Give consideration to prevent unplugging of equipment that contains life-support systems and the use of twist-lock plugs to prevent accidental removal from the power supply.
- Give consideration to the spectral quality of lights for some species, override system requirements, dual-level lighting, and light/dark cycle details.
- Environmental monitoring, which "should be considered" for sensitive areas. Automatic systems are advisable.
- Larger drainpipes are defined as more than 6 inches.
- Cap floor drains when not in use.

References
1. Guide for the Care and Use of Laboratory Animals: Eighth Edition: http://www.nap.edu/catalog/12910.html
2. Association for Assessment and Accreditation of Laboratory Animal Care: http://www.aaalac.org/about/guidelines.cfm