

News to Use

Design Requirements Manual

The formulae $\frac{\partial \rho}{\partial t} + \frac{\partial}{\partial x_j} (\rho u_j) = -\frac{\partial \rho}{\partial x_j} \left(\mu \frac{\partial u_j}{\partial x_j} \right) + \rho (\rho - \rho_0)$ for building $\frac{\partial}{\partial x_j} (\rho u_j) = -\frac{\partial \rho}{\partial x_j} \left(\mu \frac{\partial u_j}{\partial x_j} - \rho \overline{u_j^2} \right) + \rho (\rho - \rho_0)$ state of the art $\frac{\partial}{\partial x_j} (\rho u_j) = \frac{\partial}{\partial x_j} \left(\mu \frac{\partial u_j}{\partial x_j} - \rho \overline{u_j^2} \right) + \rho (\rho - \rho_0)$ biomedical research facilities.

'Design Requirements Manual (DRM) News to Use' is a monthly ORF publication featuring salient technical information that should be applied to the design of NIH biomedical research laboratories and animal facilities. NIH Project Officers, A/E's and other consultants to the NIH, who develop intramural, extramural and American Recovery and Reinvestment Act (ARRA) projects will benefit from 'News to Use'. Please address questions or comments to: ms252u@nih.gov

Animal Research Facility Lighting and Controls

Lighting level and control in areas within animal research facilities depend on the usage of the space and on the species occupying the space. All lighting fixtures in animal research facilities shall be factory sealed and gasketed to prevent vermin harborage and transmission in/through lighting fixtures. Lighting fixtures shall have number of ballasts as required for the lighting control. Feed-thru and/or tandem wiring is not acceptable.

Lighting fixtures shall be listed for damp locations except for areas subject to water such as large animal and non-human primate holding rooms and ante rooms; quarantine and cubicle holding rooms; cage wash rooms. Lighting in those areas shall be UL listed for wet location, capable of withstanding a hose directed spray (minimum 85 pound per square inch) or minimum ingress protection (IP) rating of 65. In environmental and waste holding rooms, lighting fixtures shall be vapor-proof.

Typically recessed lighting fixtures with fluorescent lamps are utilized in all areas except for loading docks, where other lamp types may be preferred. Animal holding areas may require a single lamp fixture with red (or possibly other color) sleeve or filmed lens at the discretion of veterinary program. The actual user shall provide information for sleeve or lens film color.

Lighting control systems for animal holding areas shall be programmable, using either the building automation system (BAS) or a stand-alone system (which may also be used for flushing operation of animal watering system), depending on which lighting control method is more cost effective. Consider using individual astronomical timers as a cost effective method for lighting control for small new facilities and small renovations. Provide a terminal for user control and adjustment of lighting cycles within the vivarium supervisor's office, or at another location within the vivarium as directed by the user. Coordinate dimming control requirements (to simulate dusk and dawn circadian cycles) with the veterinary program.

Animal holding area lighting control requires programmable diurnal lighting cycle, which typically provides 12 hours "on" cycle and 12 hours "off" cycle, allowing adjustment of either

cycle duration or providing for multiple cycles in a single day at user discretion. Provide one local override switch outside each holding room door to turn on the lamp(s) associated with the "on" cycle, plus remaining fixture lamps to achieve an 800 lux (75 FC) level within each room during caretaker cycle. For both lighting operation scenarios, override switch shall circumvent the programmable lighting panel controls diurnal cycling for a user adjustable time period of between 0 to 60 minutes, and then have the programmable lighting control revert back to its normal diurnal cycle as previously programmed.

Lighting fixtures and controls for the animal holding rooms that require flexibility to handle either species shall follow the requirements of the large animal holding room.

In addition to legally required emergency lighting, provide at least one emergency lighting at the following areas:

- MPW Waste Holding Area
- Large animal and non-human primate holding room and ante room
- ABSL2 procedure, necropsy and treatment rooms
- Cage wash area
- Receiving/decontaminations areas.

However, in surgery rooms, at least half of the lighting fixtures (including task and exam lighting) shall be on emergency power. In addition, all lighting in animal holding rooms may require emergency power at the discretion of veterinary program. Provide a self-testing emergency battery ballast (non-audible, visual indication only) for one lighting fixture per animal holding room. Emergency battery ballasts shall operate under the same diurnal controls as normal power operation, i.e. the ballasts shall turn the lamp(s) on during the programmed "on" diurnal cycle only, and not turn on any lamps if a power outage occurs during the programmed "off" cycle. When either emergency power is available or normal power is restored, the emergency battery ballasts shall revert back to their standby operation.