

News to Use

Design Requirements Manual

The formulae $\frac{\partial \mu_i}{\partial x_j} + \frac{\partial}{\partial x_j}(\rho_j \mu) = -\frac{\partial \rho}{\partial x_i} + \frac{\partial}{\partial x_j}(\mu \frac{\partial \rho_i}{\partial x_j}) + \rho_i(\rho - \rho_i)$ for building $\frac{\partial}{\partial x_j}(\rho_j \mu) = -\frac{\partial \rho}{\partial x_i} + \frac{\partial}{\partial x_j}(\mu \frac{\partial \rho_i}{\partial x_j} - \rho_i \frac{\partial \mu}{\partial x_j}) + \rho_i(\rho - \rho_i)$ state of the art $\frac{\partial}{\partial x_i}(\rho_j \mu) = \frac{\partial}{\partial x_i}(\mu \frac{\partial \rho_j}{\partial x_i})$ 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

Interior Finishes in Biomedical and Animal Research Facilities

Materials selected for the finishes of laboratories shall be durable, smooth, and easily cleaned, provide ease of maintenance, minimize pest access, and contribute to the creation of a comfortable, productive, and safe work environment. All finishes shall be sealed to provide a positive barrier against the harborage of pests and vermin.

For most laboratory spaces, lay-in acoustical ceiling tiles shall be provided. Acoustic tiles shall have a cleanable, smooth surface with a vinyl face or equivalent and have a square edge. Tegular edges are not permitted. Ceiling tiles must be laid out symmetrically so that tiles and grid members retain modular dimensions. All ceiling suspended items shall be secured from independent structural assemblies attached directly to the structural floor and framing members overhead. Hard ceilings, (gypsum board, fiber reinforced polyester (FRP), glass-fiber reinforced composite panels (GFRC panels)) equipped with access panels, shall be provided in glass-ware washing and autoclave rooms or where the potential for a high moisture level exists. All areas within the animal facility, except personnel support spaces, require ceilings that are smooth, free of crevices and capable of withstanding scrubbing with detergents, disinfectants, and water under pressure on a frequent basis.

Wall surfaces shall be free from cracks, unsealed penetrations, and imperfect junctions with ceiling and floors. Materials shall be capable of withstanding washing with strong detergents and disinfectants. Selection of wall treatments shall be based on the functional use and purpose of the area, as well as any infection control and chemical resistance requirements. Sound control and acoustical properties within the area shall be considered when material selection is made.

Wall coverings and fabrics are NOT permitted in laboratories. Walls in animal facilities shall be constructed of concrete, concrete block, or surfaced with a heavy duty, impenetrable veneer, such as fiberglass reinforced panels (seamless) since these walls are subject to water daily, including impact damage from hose streams.

Laboratory floor materials shall be seamless, slip resistant nonabsorbent, resistant to wear, and resistant to the adverse effects of acids, lab chemicals, solvents, cleaning materials, decontamination chemicals and detergents. Floor materials shall

be installed to allow for decontamination with liquid disinfectants and to minimize the potential spread of spills. Carpet is not permitted. The A/E selections shall be influenced by an understanding of the specific use of the particular area. When selecting floor finishes the A/E shall consider: durability and permanence; functionality of room/space; maintenance; floor flatness (F_F) and floor levelness (F_L). Flooring shall be installed under casework.

Floors in animal facilities shall be smooth, durable, moisture proof, nonabsorbent, and slip resistant and resistant to the adverse effects of disinfectants, high temperature water, detergent cleaning, and chemicals used in holding and procedure rooms and continuous movement of cages and equipment. If thresholds are used to separate dissimilar flooring materials, provide type that permits the easy wheeling of cages or other equipment through the animal facility. Rubber flooring, VCT, vinyl base are NOT permitted in Animal Facilities. Seamless, monolithic flooring material shall be carried up walls 150 mm (6") minimum, integral with floor with coved corner. A water vapor transmission and core test shall be performed prior to application. Control and expansion joints shall be flush. Concrete surface preparation shall be shot blast. Floor shall slope to drains and top coat shall be slip resistant.

The main criteria for high performance coatings or manufacturer applied composite systems within containment facilities are chemical resistance, smoothness, durability, and ease of cleaning. Finish material, factory or field installed, shall be selected based upon these and other project specific set of criteria. Consideration shall be given to the corrosive chemical activity of disinfectants, decontamination gases/vapors, and other chemicals used in the laboratory.

Finishes and construction details shall provide a barrier against the harborage of pests and vermin. Joints between dissimilar materials shall be considered as a stress point and shall be constructed to prevent cracking.

Walls and ceilings shall be finished with a scrubable, chemically resistant material, free from cracks. Seal penetrations and imperfect junctions at ceilings and base. Materials shall be capable of withstanding the effects of strong detergents and disinfectants and be capable of withstanding the impact of normal traffic.