

# News to Use

## Design Requirements Manual

The formulae  $\frac{\partial \mu_i}{\partial \alpha_i} + \frac{\partial}{\partial \alpha_i} (\rho_i \mu_i) - \frac{\partial}{\partial \alpha_i} \left( \mu_i \frac{\partial \mu_i}{\partial \alpha_i} \right) + \mu_i (\rho_i - \rho_i)$  for building  $\frac{\partial}{\partial \alpha_i} (\rho_i \mu_i) - \frac{\partial}{\partial \alpha_i} \left( \mu_i \frac{\partial \mu_i}{\partial \alpha_i} \right) + \mu_i (\rho_i - \rho_i)$  state of the art  $\frac{\partial}{\partial \alpha_i} (\rho_i \mu_i) - \frac{\partial}{\partial \alpha_i} \left( \mu_i \frac{\partial \mu_i}{\partial \alpha_i} \right) + \mu_i (\rho_i - \rho_i)$  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: [shawm@mail.nih.gov](mailto:shawm@mail.nih.gov)

## Environmental Management

**E**nvironmental management is very important to the NIH ensuring the health and well-being of NIH employees, visitors, and neighbors. Federal laws applicable to environmental management on the NIH campus include: Clean Air Act, Clean Water Act, Hazardous Materials Transportation Act, National Environmental Policy Act, Resource Conservation and Recovery Act, Safe Drinking Water Act, Toxic Substances Control Act and Worker Safety Requirements.

National Environmental Policy Act (NEPA) applies to all construction projects regardless of the size. The project officer, Division of Environmental Protection (DEP) and Division of Facilities Planning work together to determine actions required for the project. All NIH facilities shall be designed to minimize the use of hazardous substances. The use of alternative non-hazardous or nontoxic materials is required in all new construction and renovations. The A/E shall develop a plan for eliminating the use of hazardous substances and where hazardous substance use is unavoidable; the A/E shall demonstrate that alternate non-hazardous substances are not available. Examples of hazardous substances that shall be avoided include, but are not limited to: oil-based paints and sealants; hazardous cleaning, surface preparation, and paint-stripping solvents; and petroleum-based contact adhesives.

### Receiving Areas:

Hazardous substances used in a laboratory delivered directly to the end-user laboratory from the loading dock do not require staging and temporary storage areas.

Materials used in support of a facility such as chemicals used for washing glassware, cage washing, or neutralizing wastewater discharges, must be placed in a hazardous-substance storage area. Buildings utilizing these hazardous substances shall be designed with a receiving and storage area located at or near the point of use of the materials and shall be used for long term storage of hazardous materials.

### Storage and Staging Areas:

Hazardous-substance storage areas shall be out of the normal flow of personnel traffic and shall be located near the loading dock for easy access to the trucks used to transport the waste for processing. Convenient access from the storage room to the freight elevator shall be provided without having to traverse heavily used corridors so as to minimize the risks to the building occupants during the transport of the waste.

The storage and staging area shall be large enough to store the hazardous substances and provide room for loading and unloading the drums or containers. If multiple substances are stored, the design shall allow incompatible materials to remain segregated while in storage.

Spill containment in each section of the storage room shall be designed to contain any spills of hazardous waste resulting from mishandling the waste materials. Some options for spill containment within the storage room include a spill-containment curb around the room, secondary containment bins, shelving designed to contain spills, or a combination thereof. Any curb used for containment spills shall be designed to allow convenient ingress/egress using a drum trolley. Each section of the storage area shall be designed to contain a spill of a minimum of 4 L of liquid. The configuration of the storage area shall be designed to facilitate spill cleanup. Interior surfaces of the storage area shall be cleanable, corrosion resistant, and non-reactive.

A chemical-resistant coating shall be applied to the walls and floor in this area to contain spills and to facilitate cleanup. These areas shall be thoroughly sealed to minimize pest harborage and exclude pests.

Safety equipment including emergency eyewash, emergency shower, and a telephone shall be provided for each storage room and staging area. The

telephone to contact emergency response personnel shall be located either in the room or within 10 m of the room. Fire protection design requirements shall apply if flammable materials are stored.

### Hazardous Waste Storage and Handling at On-Campus Buildings:

Laboratory and animal research facility buildings on the NIH campus shall be designed with a room for temporary storage of hazardous waste and radioactive wastes. Mixed waste (hazardous waste that is also radioactive) shall be treated as radioactive waste in this temporary storage area. Hazardous waste is generally stored in this room for several hours or overnight.

### Layout and Size:

The storage room shall be large enough with two sections (one for hazardous waste and one for radioactive waste) to provide for temporary storage of the hazardous waste and radioactive waste, and for storage of specialized carts to transport the hazardous waste from the laboratories. The hazardous waste storage section shall be 2.5 m x 3.5 m minimum. The radioactive waste storage section shall be 0.75 m x 1.5 m minimum.

### Storage Cabinets:

A minimum of three 2 m-high storage cabinets shall be provided in each room to provide segregated storage of incompatible materials. Open floor space in the storage room shall accommodate one 1 m-long waste cart and allow access to the storage cabinets and shelving.

### Ventilation System:

A separate ventilation system shall be installed for the storage room. Exhaust shall be directed away from the building and surrounding buildings' air intakes. This ventilation system shall be connected to the building's emergency power system.

### Fire Protection:

Sprinkler protection in the room shall be designed to meet the requirements for Ordinary Hazard Group 2.

### Design Review and Approval:

The Division of Radiation Safety and DEP shall review all designs for hazardous waste storage rooms and shall provide the final approval of the design.

### Hazardous Substances Storage and Handling within Laboratories:

Laboratory Modules: All laboratory modules shall be designed for the safe storage of hazardous substances while discouraging the storage of excessive amounts of hazardous substances. All wet laboratories shall contain an approved ventilated acid (corrosive) cabinet and an approved flammable materials storage cabinet. The sizes of these cabinets shall be based on the volume of corrosive and flammable materials used in the laboratory. The location of radioactive storage cabinets shall be standardized in the laboratories to assist emergency response personnel, optimally located near the laboratory door for convenient access by the technician collecting the hazardous waste.

For laboratory modules with a service corridor, the storage area shall be located near the service entrance rather than the hall entrance, avoiding the transport of hazardous waste through the main corridors of the laboratory building. There shall be no flammable storage cabinets located under fume hoods. Acid storage cabinets shall be ventilated and are typically located beneath fume hoods. If no fume hood is present, exhaust ventilation must be provided to these cabinets. Acid cabinets and flammable material storage cabinets shall be located diametrically opposed from each other and towards the back of the laboratory away from the laboratory entrance.