

News to Use

Design Requirements Manual

The formulae $\frac{\partial U_i}{\partial x} + \frac{\partial}{\partial x} (\mu U_i) = -\frac{\partial}{\partial x} + \frac{\partial}{\partial x} (\mu \frac{\partial U_i}{\partial x}) + \kappa_i (\rho - \rho_0)$ for building $\frac{\partial}{\partial x} (\mu U_i) = -\frac{\partial}{\partial x} + \frac{\partial}{\partial x} (\mu \frac{\partial U_i}{\partial x} - \rho \overline{U_i}) + \kappa_i (\rho - \rho_0)$ state of the art $\frac{\partial}{\partial x} (\mu U_i) = \frac{\partial}{\partial x} (\mu \frac{\partial U_i}{\partial x})$ 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

Emergency Power

Emergency electrical power shall be provided to all life safety and critical mechanical systems and laboratory equipment. The DRM provides a comprehensive list of equipment and systems that must be placed and list of equipment and systems recommended being on emergency power as listed below.

Life safety loads shall be wired separately from normal powered, legally required and optional standby loads.

The following devices/systems shall be connected to the life safety emergency power system:

Emergency egress lighting; Egress signage; Communications systems (including PA systems); Fire alarm systems; Self-contained battery-powered lighting at generator set location; Medical gas alarm systems; Fire suppression systems (fire pumps, compressors, valves, etc); Security, intrusion detection and access control systems; Building Automation Systems including control air compressor for buildings with smoke evacuation; Automatic doors used for egress; Elevator cab lighting, control, communication and signal systems; Generator day tank pump.

The following systems shall be considered legally required standby loads and shall be connected to the emergency power system:

Fire department receptacles; Pumps, components and all devices associated with fuel stored in large storage tanks serving the emergency generator; Sewage ejector systems; Sump pumps; Sump dewatering pumps; Lighting provided at the generator; Critical supply and exhaust fans; Operating rooms; One elevator per bank of elevators and associated elevator machine room air handling units (All elevators shall be on emergency power with only one elevator per each bank of elevators to run at a given time. The lock-out of the elevators shall be provided by the elevator controller); Building Automation Systems including control air compressor for buildings without smoke evacuation; Air handling systems associated with active smoke purge/evacuation systems; Medical gas systems; Fume hood exhaust fans.

The following systems shall be considered optional stand-by loads and are recommended to be connected to the emergency power system based on the critical nature of the scientific program requirements and project budget.

UPS systems, Automatic temperature control system components; Auxiliary mechanical equipment that supports heating and cooling systems; One light fixture per module per laboratory minimum; Biosafety cabinets, Incubators, Biobubbles, Containment devices, etc.; Supply and Exhaust fans and associated controls for animal areas; Laboratory equipment alarm monitoring system; High-value specimen refrigerators, Freezers, Cold rooms, Warm rooms, etc.; Closed circuit television cameras and associated equipment; Lighting control systems; Select lighting and receptacles in electrical distribution equipment, mechanical rooms and major telecommunication rooms; Lighting in animal facilities, if defined by program requirements; Computer room air handling units; Air-conditioning units serving main telecommunication room; Cooling systems such as water chillers, cooling towers, pumps and associated systems which serve critical areas; Heating systems including: boilers, heating water pumps and associated fuel oil system; Steam condensate pumps; Domestic water pumps; Hands free toilet flushers and lavatory faucets; Electrical heat tracing for hydronic piping; Critical scientific equipment identified by program requirements.

The users and the owner should realize the impact of losing valuable research due to power outage that may occur only once or twice a year versus increased initial cost for a larger generator and associated distribution system.

Commissioning and testing/verification of emergency systems are crucial for system reliability.