

The formulae $\frac{\partial \rho U_i}{\partial t} + \frac{\partial}{\partial x_j} (\rho U_j U_i) = -\frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j} \left(\mu \frac{\partial U_i}{\partial x_j} \right) + g_i (\rho - \rho_0)$ for building $\frac{\partial}{\partial x_j} (\rho U_j U_i) = -\frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j} \left(\mu \frac{\partial U_i}{\partial x_j} - \rho u_i u_j' \right) + g_i (\rho - \rho_0)$ state of the art $\frac{\partial}{\partial x_i} (\rho U_i H) = \frac{\partial}{\partial x_i} \left(\lambda \frac{\partial T}{\partial x_i} - \rho u_i h' \right)$ 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

The 2016 NIH Design Requirements Manual

The National Institutes of Health (NIH), Division of Technical Resources (DTR) has now released the 2016 edition of the NIH Design Requirements Manual (DRM). The 2016 DRM was made effective on December 12, 2016 and is applicable to all design and construction projects in NIH owned and operated facilities or other facilities where construction is funded by the NIH. All design and construction contracts initiated after the effective date will be required to follow this newest edition. The 2016 DRM constitutes a major restructuring and reorganization of the previous edition with the inclusion of vast amounts of new and updated information for architects & engineers (A/E) and stakeholders to use in the facility design process.

The 2016 DRM is the most comprehensive design guide of its kind in the U.S., providing guidance to design professionals for building complex research facilities and other similar facilities. Drawing on NIH's lengthy expertise and experience with research facilities and infrastructure, the updated DRM provides insight into the intricacies and best practices involved in the design and operation of these spaces.

To coincide with the release of the new DRM, DTR will also be revamping the News to Use publication. Volume 2 of News to Use will cover the most recent information provided in the 2016 DRM as well as the latest in technology and relevant NIH facility construction practices.

Revisions from the 2008 DRM:

The 2016 Design Requirements Manual has undergone major changes and restructuring from the 2008 edition. Every chapter and appendix has been revised to align with the latest trends and practices in research facility design.

Some of the notable additions / changes to the 2016 edition are as follows:

- **Updated Sustainable Design Information:** In order to meet new and changing sustainability goals, the DRM now provides further guidance on the design of facilities with smaller carbon footprints and reduced energy consumption. Many new technologies, from LED lighting to better building envelope construction, have been incorporated into the requirements and align with the latest federal mandates and executive orders.

- **New Information on Critical Facilities:** As research is ever changing, so are the requirements for engineering and construction of complex research facilities. Critical facilities such as cGMP and BSL3 require systems and architecture that work in conjunction with the research being conducted. The 2016 DRM provides the latest guidance on the design and construction of these complex spaces.
- **New Information on Disaster Planning & Common Engineering Issues for Research Facilities:** Failures in engineering and architecture systems can result in disruption of operations or worse, the loss of research. Protecting research is paramount as its true cost is almost incalculable. NIH has a significant amount of expertise and lessons learned from the design and operation of research facilities and in the new 2016 DRM, DTR has included many of these valuable lessons and insights into assessing and protecting research buildings and infrastructure.
- **User-Friendly:** The 2016 DRM contains significantly more diagrams and graphics to help illustrate complex planning & design concepts. Additionally, the 2016 DRM is in an easier to read, two-column format with internal links to make reading significantly more comfortable. Lastly, the updated DRM now contains "Rationales" to help explain complex or commonly misunderstood architecture and engineering requirements.
- **New Appendices & Reference Documents:** New and updated appendices provide more concise and valuable direction to A/Es. Some new and updated appendices include: A/E Submission Requirements, Room Data Sheets, and a Sample Equipment Schedule, among others.

After a long and methodical process, the 2016 DRM has been published. It is through the efforts of many dedicated individuals that the 2016 DRM has become a reality. DTR extends our sincerest thanks to all of the people who helped improve and refine the 2016 NIH Design Requirements Manual.

