

News to Use

Design Requirements Manual

The formulae $\frac{\partial x_i}{\partial a_j} + \frac{\partial}{\partial a_j}(\rho_i \mu_j) = -\frac{\partial}{\partial a_j} \left(\frac{\rho_i \partial x_i}{\partial a_j} \right) + x_i(\rho - \rho_i)$ for building $\frac{\partial}{\partial a_j}(\rho_i \mu_j) = -\frac{\partial}{\partial a_j} \left(\frac{\rho_i \partial x_i}{\partial a_j} - \rho_i \mu_j \right) + x_i(\rho - \rho_i)$ state of the art $\frac{\partial}{\partial a_j}(\rho_i \mu_j) = \frac{\partial}{\partial a_j} \left(x_i \frac{\partial x_i}{\partial a_j} - \rho_i \mu_j \right)$ 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: ms252u@nih.gov

HVAC Thermal Insulation Systems

Thermal insulation systems are the key element to prevent heat loss and heat gain and to improve energy efficiency. Thermal insulation systems specified for use at NIH shall meet current industry standards.

The Design Guidance portion of DRM Section 6-4 defines the minimum insulation standards (i.e. material specifications and thicknesses) for NIH projects and is intended as a guide for the specific services listed as well as other similar services that may not be indicated. The A/E shall select the most suitable insulation material for piping based on the latest applicable energy efficiency standard(s) or DRM Exhibit X6-4-A, whichever is more stringent. The DRM Exhibit X6-4-B provides minimum insulation thicknesses for piping, cold equipment, hot equipment, supply air ductwork, and outdoor air ductwork. The A/E shall select the most suitable insulation thicknesses based on the latest version of ASHRAE 90.1 or DRM Exhibit X6-4-B, whichever is more stringent.

Insulation materials approved for use in NIH buildings shall have a fire hazard rating not to exceed 25 for flame spread and 50 for smoke developed. All materials shall be factory tested as an assembly. Fire ratings shall be determined by the standard method of testing for surface-burning characteristics of building materials, ASTM E84 or NFPA Standard 255. Insulation shall have a UL label or a certified test report from an approved testing laboratory.

All insulation installations shall be in accordance with the National Commercial & Industrial Insulation standards published by the Midwest Insulation Contractors Association. All adhesives, sealers, vapor barrier coatings, etc. used in conjunction with insulation shall be compatible with the material to which they are applied. Any cement, sealer or coating used shall be resistant to vermin and mold. Metallic components used for the installation of insulation systems shall be suitable for the intended environment and shall be non-corrosive.

All insulation surfaces shall be durable and, where exposed, protected from damage due to

maintenance operations, vandalism, weather, and normal wear and tear. Insulation exposed to weather shall be covered with 0.41 mm (0.016 in.) aluminum jackets.

Insulation shall be continuous at all hangers, hanger rods, supports, sleeves, and openings. Vapor barrier shall be provided for all cold surfaces and shall be continuous. Where supports occur below the insulation surface, the thickness shall be maintained over the support and shall extend sufficiently beyond the support to prevent condensation. Insulation shall be sealed at all termination points.

All insulation shall be arranged to permit expansion and contraction of systems without causing damage to the insulation or surface. High-density pipe saddles or welded pipe standoffs shall be provided at all points of pipe support.

Valves shall be insulated up to and including bonnets. Cold water valves shall be insulated over packing nuts in a manner to permit removal for adjustment and repacking.

Insulation in containment spaces must be sealed at each end and must have a smooth and cleanable jacket.

The A/E shall specify that the constructor shall not insulate the specified systems until all necessary tests have been conducted for each component; surfaces have been thoroughly cleaned; and surfaces are in a dry state.

Not all systems require thermal insulation. Systems not requiring insulation include:

- Brass or copper pipe specified to be chrome plated (typically applies to toilet rooms),
- Steam traps, steam powered pumps,
- Steam condensate pumps,
- Concealed relief piping from safety valves,
- Fire protection piping and components,
- Fuel oil piping and components;
- Exposed ducts in air-conditioned spaces if duct is not prone to condensation,
- ASME stamps,
- Access plates of fan housings,
- Cleanouts or hand-holds.