

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 $\frac{\partial}{\partial x_j} (\rho U_j U_i) = -\frac{\partial P}{\partial x_i} + \frac{\partial}{\partial x_j} \left(\mu \frac{\partial U_i}{\partial x_j} - \rho \overline{u_i' u_j'} \right) + g_i (\rho - \rho_0)$ state of the art $\frac{\partial}{\partial x_j} (\rho U_j U_i) = \frac{\partial}{\partial x_i} \left(\mu \frac{\partial U_i}{\partial x_j} - \rho \overline{u_i' u_j'} \right)$ biomedical research facilities.

DRM Update: Grooved Piping

The recent DRM update has made a significant change to piping requirements. NIH-DRM Exhibit 6.3 “Piping Designation, Material, Fittings and Joints”¹ previously stated that grooved piping was approved for use in various mechanical applications, including chilled water, condenser water, and process cooling water. The DRM revision, however, has removed grooved piping and the associated joints as an acceptable option for these mechanical and HVAC applications (see updated DRM Revision 1.1, dated 8/22/2018).

Previously, where such joints were permitted on these piping systems, it was required that joints “shall only be permitted where the joints are located to be accessible.” The intent was to permit inspection of the joints to determine if they were subject to leakage over time. This precluded the use of such a pipe-joining method in enclosed chases, above critical spaces, or within non-accessible areas.



While the use of grooved piping is accepted by the industry for these applications, it’s impossible to inspect the joints to ensure ongoing integrity once piping is installed and fully insulated without removing and later re-installing the piping insulation. Over the past several years, the NIH Campus has experienced several high-profile failures of grooved piping joints on chilled water and heating water applications. These failures resulted in

flooding, loss of building use, impact to research, and significant costs associated with remediation. In order to reduce potential for future flooding, NIH has determined that joints on the affected systems will be welded, threaded, or joined as otherwise permitted by the newly revised DRM. This impacts installations at the Bethesda campus only; other off-campus NIH locations will be evaluated in consultation with the facility operations staff.

Designers will need to include provisions for pipe movement and expansion in designs with approved joining methods (e.g. welding, threading), which do not accommodate movement that grooved pipe couplings will tolerate (see DRM Section 6.3.9.4, “Thermal Expansion,” for further provisions).

This update does not impact any approved fire protection piping systems or other approved systems (such as above ground domestic or lab cold water), fitting types, or joining methods as designated and approved by DRM Exhibit 6.3. The fire protection piping systems at the Bethesda campus are installed per applicable NFPA requirements and as approved by the NIH Division of the Fire Marshall, the campus’s authority having jurisdiction (AHJ). Piping systems for fire protection in any location other than the Bethesda campus will be installed as determined by the AHJ. Other grooved joint applications (e.g. domestic water above ground) remain a potential option, provided that all requirements listed within Exhibit 6.3 and its associated notes are met.

Applications where the design engineer believes that a grooved piping system would provide advantage over the approved joining method for mechanical piping systems can submit a DRM variance form², which will be evaluated for the specific project application and facility risk analysis.

Resources

¹ DRM Exhibit 6.3 “Piping Designation, Materials, Fittings, and Joints,” keyed note 13

² DRM Appendix K: DRM Variance Form

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Further details on this month’s topic are available on the DRM website Chapter 6 Piping Systems Section 6.3

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