Piping Systems - Design and Materials

The DRM specifies piping materials for use in systems within and outside of the laboratory that are intended to provide uniformity of design, be cost effective, and promote compatibility with other building materials and building systems. Hydronic plumbing and process piping systems in NIH facilities shall be designed for ease of system maintenance and component replacement, system reliability, and extended service life.

Piping systems consisting of different hydronic zones shall be provided with interconnecting means to be used when serving critical areas. Each piece of equipment shall be provided with a means to determine balance and control water flow. Balancing valve and flow meter fittings shall be provided at each floor for every riser. Hydronic equipment and systems shall not be installed inside BSL-3 containment.

NIH has researched and made recommendations regarding the use of specific pipe materials and quality. For example, the use of stainless steel traps is described in Exhibit X4-7-A “BSL3 Caulking and Sealants.”

Selection of pipe materials and installation methods shall incorporate special requirements unique to individual program areas, such as consideration of magnetic fields, special materials, shielding, and chemical exposure, etc. Piping/plumbing (p/p) systems may differ in animal facilities versus in a laboratory. Animal facility p/p systems may include cage wash, waste drainage, animal drinking water, and vivarium gas systems. These systems require special materials, shielding, and chemical exposure, etc. These systems can be constant or variable flow and include heat exchangers, duplex distribution pumps, expansion tank(s), makeup water provisions, air separator and two or three way terminal device control valves. Heating water systems shall be designed to offer N+1 reliability and maintain 100% capacity in the event a lead component fails.

Cooling in NIH facilities is to be provided by the use of chilled water. Chilled-water cooling coils shall be selected to ensure that the interior space relative humidity is maintained at full and part-load conditions. Chilled water coils shall be selected for an entering water temperature of 7.2°C (45°F) and leaving water temperature of 15.6°C (60°F) at peak demand.

Water piping installation at the NIH Bethesda campus and Poolesville facilities shall utilize Type K (hard-drawn) tubing. Extramural projects located outside of the Washington DC area may use Type L (hard-drawn) copper piping for above ground water piping installations if prevailing practices and water supply conditions are compatible with Type L (hard-drawn) copper tubing.

Materials and application of pipe hangers, supports, joint welding, brazing and soldering shall conform to the latest requirements of ANSI/ASME B31.1 or ANSI/ASME B31.9 and MSS Standard Practice SP-58, SP-69, and SP-89, and other applicable specifications. All p/p systems shall be provided with a complete identification system that conforms to the requirements published in ANSI/ASME Standard 13.1 and NFPA 99.