

Design Considerations for FDA, USDA & Pharmaceutical Piping Systems

Process control is a major design objective of mechanical insulation for FDA and USDA facility piping applications. Pipe insulation maintains system operating temperatures, conserves energy, controls condensation, maintains hygiene and can protect expensive piping equipment from corrosion under insulation (CUI).

The selection of insulation materials for process piping are primarily driven by the operating temperatures of the process piping, thermal efficiency (k-value), moisture resistance and the recommendation by the manufacturer as safe over austenitic stainless steel piping.

Austenitic stainless steel piping is prone to a phenomenon called external stress crack corrosion (ESCC) when insulation containing halogens, such as chlorides or bromines used as flame retardants, is introduced to moisture that penetrates through the insulation system and to the outer pipe surface. Also known as chloride leaching, the chlorides gradually cause stress to the outer surface of the stainless steel that results in surface cracking that leads to eventual pipe failure.

An example of a common process control application for closed-cell flexible elastomeric foam pipe insulation is food processing facilities that must meet the United States Department of Agriculture (USDA) washdown requirements. The exposed surface of pipe insulation must be hygienic with a smooth cleanable surface and antimicrobial properties.

Like all pipe insulation types, closed-cell elastomeric insulation must be unexposed by being installed and maintained in a sanitary manner. In other words, the pipe insulation must be completely sealed and encapsulated within a protective jacketing system to protect it from frequent hot-water washdowns that can occur multiple times per day.

Aeroflex USA's Aerocel® brand of EPDM closed-cell elastomeric pipe insulation is naturally resistant to moisture due to its non-polar chemical and closed-cell structure. As a non-polar insulation, it does not induce or react to moisture within its environment. Additionally, Aerocel passes ASTM C 692 as non-corrosive and is safe for insulating austenitic stainless steel piping systems. EPDM rubber is also naturally microbial-resistant.

Aerocel pipe insulation meets the USDA unexposed requirement when jacketed in a system such as PVC, and the seams are solvently welded with the manufacturer's recommended welding adhesive.

As a turnkey solution, Aerocel with SaniGuard™ meets FDA, USDA, and Pharma requirements by offering the specified Aerocel pipe insulation and appropriately sized PVC jacketing all within the same carton for field installation. A PVC welding adhesive, offered for single-source responsibility and warranty purposes, is sold separately.

To learn more Aerocel SaniGuard, please visit

https://www.aeroflexusa.com/product_page/aerocel-with-saniguard