

THERMINOL®
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INSULATION FOR HEATING & COOLING SYSTEMS CAN PRESENT A POTENTIAL FIRE HAZARD

Fires have occurred in insulation materials that have been soaked with heating fluids at apparent temperatures of 500-600°F, which is well below the autoignition temperature of most commercial heating fluids. Tests indicate that magnesia, calcium silicate, and silicate-bonded asbestos insulations are subject to this problem. While the exact mechanism by which such fires occur is not fully understood, the most probable explanation is that a slow exothermal oxidation reaction between hydrocarbon-type heating fluids and air inside the voids of the insulation starts at about 500°F. Such a reaction is believed to occur because the combination of the large heating fluid surface exposed on the insulation fibers, poor heat dissipation conditions, and the formation of low flash point oxidation products, can cause a temperature build-up in the saturated insulation mass resulting in ignition of the material when exposed to air.

Calcium silicate, asbestos, and magnesium oxide insulation can saturate with almost their original weight of leakage fluid. This saturation when spread over the large surface area within the insulation at high temperature can give rise to oxidation of heating fluid and the formation of lower boiling, more combustible, decomposition products. Subsequent ignition of the fluid within the insulation system can result.

An alternate insulation, cellular glass, tends to saturate at less than one-third of its original weight and is, therefore, a safer insulation to use. Cellular glass is not an economical insulation for most applications because of its higher installation cost and its lower mechanical strength. The uses of cellular glass insulation does not insure that insulation fires will not develop, but the amount of fluid that can saturate the insulation system and be oxidized is greatly reduced.

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Insulation systems can be designed to minimize fire problems in the event of fluid leakage. The following suggestions are offered to minimize the fire hazard potential in insulation systems.

- Take every precaution to install and maintain a leak-free piping system when combustible heat transfer fluids are being used. Reduce the number of flanges in initial system design. Use suggested piping specification.

- On horizontal runs of pipe with welded joints and proper flange fittings, use the standard high temperature insulation such as calcium silicate, magnesium oxide, etc.

- On vertical runs of lines where occasional leak sources can develop at flanges and valves, install protective, tight fitting caps below flanges and valves to divert any fluid leakage to the outside of the insulation system.

- Install valve stems horizontal so that any stem leakage does not enter insulation.

- On those sections of lines where control valves and instrument fittings are attached and where leakage is a potential problem, install cellular glass insulation or metal shielded insulation to minimize or eliminate any potential saturation of leakage fluid into the insulation system.

- On jacketed vessels where leakage due to metal failure can occur, install a heave gauge metal foil barrier between the jacket surface and the insulation system. Should leakage occur at this point, it should be shielded from the insulation proper and resultant saturation of the insulation would be minimized.

- Consult your insulation supplier and insurance company for suggestions toward reducing fire hazard.

The final suggestion is quite obvious; keep your Therminol system leak-free. If a leak develops, remove the insulation, contain and control fluid leakage until the leak can be repaired.

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