

Thin Aerogel Insulation Easy to Install on Underground Steam Lines

Flexible, waterproof aerogel a perfect fit in confined pipe tunnels



CASE STUDY

DETAILS

Location: Massachusetts Institute of Technology
Insulation Contractor: Anchor Insulation

CHALLENGES

- Insulation of 10-in and 5-in underground steam distribution lines located in tunnels at MIT.
- 10-in piping was 204°C (399°F), 5-in piping was 99°C (210°F).
- Steam lines located in confined spaces with difficult access.
- Tunnels are periodically flooded, creating wet, humid conditions.
- Existing calcium silicate was saturated with water, causing it to perform poorly and need replacement after one year.



SOLUTIONS

- Anchor Insulation designed and installed a solution of **Pyrogel® 6350** (6 mm) flexible, durable, hydrophobic aerogel insulation.
- Three layers of Pyrogel 6350 were used for 10-in piping, two layers for 5-in piping.
- Aerogel blankets were cut on site for straight pipe sections.
- Pre-fabricated "lobster tail" sections were used for elbows.
- Each layer was installed separately, using staples on each layer and then banding or wiring each elbow gore and banding straight pipes. All wire and banding was stainless steel.

BENEFITS

- Pyrogel insulation performance unaffected over time by wet environment, due to hydrophobicity of aerogel.
- Aerogel insulation was easier to handle and install in limited spaces in manhole.
- Aerogel was less dusty than other insulation materials.
- Simple installation: blankets cut on-site with utility knife or scissors; fitted lobster tail patterns for elbows.
- Anchor did not have to order specific pipe-sized preformed insulation or encounter delays if it did not fit pipes. Pyrogel was a "one size fits all" solution, cut from roll to fit all pipe sizes.

Flexible 6 mm Pyrogel® 6350 aerogel insulation was ideally suited for the many bends and twists in the MIT steam lines.

Anchor Insulation installers overcame the tight working spaces by using Aspen's pre-fabricated "lobster tails" for elbows and cutting straight sections of aerogel blanket insulation on site to fit where needed – which meant they did not have to shut down to premeasure pipe sizes as with other insulations.

"It was a very congested space and conventional calcium silicate insulation is difficult to transport into a manhole. Pyrogel is very thin, very flexible, and lighter. Handling is much easier, especially in confined, tight areas."

Jerry Fiske
Anchor Insulation Company

