

REAL WORLD RESULTS

City of Lewiston's Armory Reduces Heat Loss with New Ever Green™ Cut 'n Wrap™ Insulation Kits

Energy consumption and greenhouse gas emissions are major concerns for managers of institutional building space heat distribution systems. While the energy savings from insulating pipe sections in a heated piping system are apparent, the complex geometrical configuration of the fittings make these components more difficult to insulate. It has become common practice to leave these valves and fittings uninsulated. When left bare, however, uninsulated valves and fittings can lose huge amounts of heat that can add significant cost to the energy bill. It can also lead to disturbances in electronic equipment as well as hazards associated with the extreme temperatures.

AMI Develops Prototype

Auburn Manufacturing, Inc. (AMI) has a 30-year history as a maker of textiles used in custom-made removable flange and valve insulation pads. Recognizing the need for an easier and more effective way to insulate valves, flanges, fittings and other hard-to-get-to components in steam and hot water distribution piping systems, AMI developed its patent-pending Ever Green™ Cut 'n Wrap™ insulation kit. Each "kit" contains a 4 ft. x 8 ft. modularized insulation cover and rolls of double sided hook and loop fastener. The main difference between the new insulation cover and other insulation blanket systems is the ease of installation. "You simply measure and cut the insulated material to size, wrap the exposed valve or fitting and secure with the supplied self-sealing hook and loop attachment systems," explains Kathie Leonard, President and CEO of Auburn. "Installation takes only minutes per valve or fitting. And, since they are reusable, Cut 'n Wrap covers are ideal for those valves and fittings that require periodic maintenance or inspection. We were able to demonstrate through outside testing that heat loss can be reduced by at least 85% and emissions by up to 1000 pounds/sq.ft./year by using the kits."

Demonstration Project Funded by Seed Grant

Early in 2009, Auburn Manufacturing was awarded a Seed Grant from the Maine Technology Institute (MTI) to develop and fund demonstration projects in steam and hot water distribution systems including universities, hospitals and public buildings. MTI is a state-funded nonprofit corporation that offers early-stage capital and commercialization assistance for the research and development of innovative technology-based projects that create new products, processes and services, generating high-



This well-preserved, 100-year-old, steam-heated building is now the home of the Lewiston Recreation Department. Located on Central Avenue in Lewiston, Maine, this facility has a colorful past. It was once the old Armory and hosted circus events - complete with elephants and tanks.

quality jobs across Maine. AMI used its two MTI grants to validate the technology behind Ever Green Cut'n Wrap with independent testing and to conduct several demonstration projects resulting in a patent application and initial commercialization of the product.

City of Lewiston Agrees To Demonstration Project

One of the people Auburn spoke to about participating in a demonstration project was Ian Houseal, Special Assistant to the Administrator, essentially the "Energy Czar" for the City of Lewiston, Maine. He was impressed with the energy savings potential of the new Cut 'n Wrap product and agreed to the product being installed on the steam pipe fittings in the boiler room of the city's Armory building.

The Armory is a 65,000 square foot facility used primarily for various programs run by the city's recreation department. "The

building is typically in use about 10 to 12 hours a day during the heating season," said Houseal. "The maintenance manager had noticed a significant amount of heat loss occurring in the boiler room during the heating season. He also noted the piping system's touch temperature presented potential safety risks for the municipality's maintenance crew."

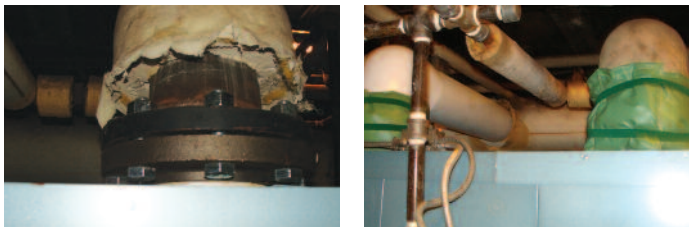


Figure 1A (on the left) shows a bare 4 inch NPS gate valve stem and Figure 1B (on the right) shows a similar gate valve stem insulated with an Ever Green™ Cut 'n Wrap™ insulation blanket. This single blanket on a 4 inch NPS gate valve stem is estimated to save about \$45 per year of lost heat and reduce greenhouse gas emissions by about 530 pounds per year. The Cut 'n Wrap materials are estimated to cost about \$38 for each of these valve stems.

Benefits of Reducing Heat Loss

The primary focus of the demonstration project was reducing heat loss by insulating the bare fittings and valves in the Armory's boiler room. Reducing heat loss has a variety of benefits including lowering the air space temperature in the boiler room, reducing the fuel expense for heating, reducing greenhouse gas emissions, and improving personnel protection.

"Payback for any kind of maintenance or energy efficiency improvement is always a big consideration," said Houseal. "This time around we did not have to purchase the product because it was part of the demonstration agreement, but I was still very interested in the payback potential. Our small project yielded a simple payback of about 11 months. That is significant. Payback alone makes this product worth considering," he concluded.



Figures 2A (on the left) shows one of the two bare 6 inch NPS flange pairs on top of one of the two boilers. Figure 2B (on the right) shows the two flange pairs after being insulated with Ever Green Cut 'n Wrap™ insulation blankets. The insulation on each flange pair is estimated to reduce the cost of lost heat by about \$55 per year and the Cut 'n Wrap material cost on each flange is estimated to be about \$55, yielding an 11-month simple payback. The CO₂ reduction savings is estimated to be about 640 pounds per year.

Installation Process

Armory employees conducted the installation. "No hired outside contractor was involved," explained Houseal, "although contactors may be used for larger projects. Two employees were able to size, cut and install Cut 'n Wrap insulated covers on a total of 22 different size valves, valve stems, flanges and tees in less than 3 hours. That's the equivalent of about 7 fittings per hour or about 8.5 minutes per fitting."

Ease of installation was a major feature of the product according to Houseal. "Our maintenance supervisor, Jim Gauthier, loved the product," he said. "There was no insulation itch, and it was easy to cut and easy to put on." Cut 'n Wrap insulation covers are fabricated from industrial-grade, coated fabric insulation media. Both materials are rated for at least 500°F continuous service and were developed to provide many years of effective thermal insulation.

Estimated Savings and Reductions

Once the covers were installed, Houseal said there was an immediate change in the ambient temperature of the boiler room. While it was not possible to measure the actual reduction in heat loss during the heating season the estimated savings were calculated by Auburn Manufacturing using the 3E Plus® program that incorporates ASTM C1129 and is accepted by the Department of Energy.

The dollar savings, payback figures and reductions in CO₂ for the Armory were calculated based on the following input: estimated design conditions of steam temperature (230°F), ambient room temperature (80°F), boiler efficiency (75%), annual hours of operation (30 weeks per year), and fuel cost (\$10 per million Btus). For all 22 fittings, the annual fuel dollar savings was estimated to be \$1,363 and the annual CO₂ emissions reduction was estimated to be 14,112 pounds.

REAL WORLD SAVINGS

Annual Heat Loss Savings: \$1,365
Annual CO₂ Emission Reductions: 7 Tons
Estimated Payback: 11 Months

Since this was a pilot program, the Cut 'n Wrap product was supplied at no charge to the City of Lewiston. The estimated \$1,363 estimated savings from using Cut 'n Wrap represents about a 2.5% reduction in building energy use for space heating. "While this is not a large percentage," explained Leonard, "It should be noted that this was a small demonstration project for a single building, heated part of the year with 230°F steam. For larger buildings, or for central steam plants operating all year round at higher temperatures, the savings would be much greater and the simple payback period would be shorter."

