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## Insulate Hot Water System Equipment and Piping

*All ECM content was independently developed and reviewed to be vendor, product and service provider-neutral.*

### Description

Insulating domestic hot water, heating hot water system and steam system components will reduce energy losses throughout the facility, reducing the load on heating systems.

### Project Talking Points

- Energy is lost through pipes, tanks and equipment due to poor, missing or nonexistent insulation.
- Heating systems may need to work longer and harder when return water temperatures are lower.
- Proper insulation may allow for a reduction in leaving water temperature due to lower heat loss.
- Excess water is consumed when users run faucets while waiting for the water to get warm.
- Reduced water and energy use can be achieved by adopting inexpensive maintenance practices.
- A visual inspection may not reveal all damaged insulation; an infrared camera can help identify small perforations or weaknesses in insulation.

### Benefits

- **Cost benefits:** Hot water insulation reduces water use, lower energy bills from reduced potable water consumption and the need for water heating.
- **Environmental benefits:** Reducing heat loss lessens the energy consumed in water heating, curbing the associated emissions and reducing the overall carbon footprint of the facility. By maintaining higher water temperature at the outlet, the wait for water to heat up is shortened and consumption reduced. This decreases strain on the municipal water supply and reduces the total amount of water withdrawn from natural water bodies, protecting the natural water cycle.
- **Social benefits:** Proper insulation will prevent pipes from condensation build-up. This build-up of moisture can lead to mold and mildew growth and make occupants sick. Uninsulated steam piping can also cause severe burns when touched.



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## Purchasing Considerations

- Different thicknesses of insulation are available for different applications. Contact your insulation contractor or American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) tables to select the correct thickness for your application.
- Check with your local utility for any energy efficiency rebates available for insulation.

## How-To

1. Install insulation around domestic hot water tanks.
2. Inspect all hot water distribution piping for the condition and completeness of insulation. Look for cracked, torn or otherwise unsealed insulation on piping, elbows and other joints.
3. The use of an infrared camera can assist in identifying escaping heat. A water leak can damage insulation inside the outer jacket and reduce the effectiveness. This may not be identified upon visual inspection.
4. Consider insulating valves and other specialty items as they can be sources of considerable waste heat.
5. If fixtures take more than 20 seconds to receive hot water, consider installing additional insulation on the supply pipes or reconfiguring pipe distribution.
6. Low-flow fixtures have less water moving to them, thus requiring more time for water to reach the faucet outlet. The condition of the insulation and the configuration/distance of the branch from the main hot water loop can heavily influence the time required for hot water to arrive at a fixture.
7. Check [ASHRAE 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings](#) and local codes for required insulation thickness and material.

## Case Studies



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- [National Insulation Association](#)
  - Detailed examples of main considerations and anticipated results from insulating equipment and piping.

### **Resources**

- Alliance for Water Efficiency: [General water conservation information](#)
- National Insulation Association: [Saving Energy by Insulating Pipe Components on Steam and Hot Water Distribution Systems](#)
- [North American Insulation Manufacturer's Association](#)
- U.S. Department of Energy: [insulation-related tax credits](#)
- U.S. Environmental Protection Agency (EPA): [EnergySmart Hospitals: Retrofitting Existing Facilities](#)
- Whole Building Design Guide: [Mechanical Insulation Design Guide](#)

### **Regulations, Codes and Standards, Policies**

- [ASHRAE 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings](#). Sets the standard that most codes reference for insulation thickness and material requirements.

### **ECM Synergies**

- Practice preventive maintenance of major HVAC equipment.
- Check and repair thermal envelope.
- Establish baseline for current water consumption.

### **ECM Descriptors**

Energy, Water

ECM Attributes:

- Optimize operations

Department:

- Engineering/facilities management