



Suggested Actions

- Conduct a survey of your steam distribution system to identify locations where removable and reusable insulation covers can be used.
- Use removable insulation on components requiring periodic inspections or repair.

Resources

U.S. Department of Energy—DOE's software, the *Steam System Assessment Tool* and *Steam System Scoping Tool*, can help you evaluate and identify steam system improvements. In addition, refer to *Improving Steam System Performance: A Sourcebook for Industry* for more information on steam system efficiency opportunities.

Visit the BestPractices Web site at www.eere.energy.gov/industry/bestpractices to access these and many other industrial efficiency resources and information on training.

Install Removable Insulation on Valves and Fittings

During maintenance, the insulation that covers pipes, valves, and fittings is often damaged or removed and not replaced. Pipes, valves, and fittings that are not insulated can be safety hazards and sources of heat loss. Removable and reusable insulating pads are available to cover almost any surface. The pads are made of a noncombustible inside cover, insulation material, and a noncombustible outside cover that resists tears and abrasion. Material used in the pads resists oil and water and has been designed for temperatures up to 1,600°F. Wire laced through grommets or straps with buckles hold the pads in place.

Applications

Reusable insulating pads are commonly used in industrial facilities for insulating flanges, valves, expansion joints, heat exchangers, pumps, turbines, tanks, and other irregular surfaces. The pads are flexible and vibration-resistant and can be used with equipment that is horizontally or vertically mounted or that is difficult to access. Any high-temperature piping or equipment should be insulated to reduce heat loss, reduce emissions, and improve safety. As a general rule, any surface that reaches temperatures greater than 120°F should be insulated to protect personnel. Insulating pads can be easily removed for periodic inspection or maintenance, and replaced as needed. Insulating pads can also contain built-in acoustical barriers to help control noise.

Energy Savings

The table below summarizes energy savings due to the use of insulating valve covers for a range of valve sizes and operating temperatures. These values were calculated using a computer program that meets the requirements of ASTM C 680—*Heat Loss and Surface Temperature Calculations*. Energy savings is defined as the difference in heat loss between the uninsulated valve and the insulated valve operating at the same temperature.

Energy Savings* from Installing Removable Insulated Valve Covers, Btu/hr						
Operating Temperature, °F	Valve Size, inches					
	3	4	6	8	10	12
200	800	1,090	1,560	2,200	2,900	3,300
300	1,710	2,300	3,300	4,800	6,200	7,200
400	2,900	3,400	5,800	8,300	10,800	12,500
500	4,500	6,200	9,000	13,000	16,900	19,700
600	6,700	9,100	13,300	19,200	25,200	29,300

*Based on installation of a 1-inch thick insulating pad on an ANSI 150-pound-class flanged valve with an ambient temperature of 65°F and zero wind speed.

Example

Interpolating from the table above, calculate the annual fuel and dollar savings from installing a 1-inch thick insulating pad on an uninsulated 6-inch gate valve in a 250-pound-per-square-inch-gauge (psig) saturated steam line (406°F). Assume continuous



operation with natural gas at a boiler efficiency of 80% and a fuel price of \$8.00 per million Btu (\$8.00/MMBtu).

Results:

$$\begin{aligned}\text{Annual Fuel Savings} &= 5,992 \text{ Btu/hr} \times 8,760 \text{ hr/yr} / (0.80 \times 10^6 \text{ Btu/MMBtu}) \\ &= \mathbf{65.6 \text{ MMBtu}}\end{aligned}$$

$$\begin{aligned}\text{Annual Dollar Savings} &= \mathbf{65.6 \text{ MMBtu/yr}} \times \mathbf{\$8.00/MMBtu} \\ &= \mathbf{\$525 \text{ per 6-inch gate valve}}\end{aligned}$$

Availability

Insulation supply companies are located regionally; this expedites delivery and helps meet site-specific job requirements. Most supply companies can take measurements on-site to ensure the best fit on irregular surfaces. For customized applications, manufacturers can provide instructions regarding the installation and removal of insulating pads.

Noise Control Benefits

Specify insulating pads that contain built-in barriers for noise control.

Insulation for Steam Traps

Effectively insulate inverted bucket traps with removable and reusable snap-on insulation. Thermostatic traps and disk traps should be insulated according to manufacturers' specifications to ensure proper operation.

Before removal of all or any existing insulation material, check for asbestos in accordance with Occupational Safety and Health Administration (OSHA) regulations.

Steam Tip Sheet information adapted from information provided by the Industrial Energy Extension Service of Georgia Tech and reviewed by the DOE BestPractices Steam Technical Subcommittee.

BestPractices is part of the Industrial Technologies Program Industries of the Future strategy, which helps the country's most energy-intensive industries improve their competitiveness. BestPractices brings together emerging technologies and best energy-management practices to help companies begin improving energy efficiency, environmental performance, and productivity right now.

BestPractices emphasizes plant systems, where significant efficiency improvements and savings can be achieved. Industry gains easy access to near-term and long-term solutions for improving the performance of motor, steam, compressed air, and process heating systems. In addition, the Industrial Assessment Centers provide comprehensive industrial energy evaluations to small- and medium-size manufacturers.

FOR ADDITIONAL INFORMATION, PLEASE CONTACT:

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