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Energy Savings & Payback

By improving the energy efficiency of operations business can reduce exposure both to carbon pricing and the larger energy price rises driven by other factors. A crucial part of the efficiency investment calculation for business is the payback period: any but the most minor of efficiency actions will carry some upfront costs which must be repaid by savings if the effort is to be viable.

The table below summarises energy savings due to the use of Removable Thermocovers 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*. The energy savings is defined as the difference in heat loss between the uninsulated valve and the insulated valve operating at same temperature.

Example

Using the table below, calculate the annual fuel and dollar savings from installing a 25mm thick Thermocover on an 150mm uninsulated gate valve in a 17 bar saturated steam line (205°C). Assumes continuous operation at 80% efficiency.

Energy Savings - Mega joules (Natural Gas)

Cents per Mega joule = 0.022

| Operating Temp °C | 75mm | 100mm | 150mm | 200mm | 250mm | 300mm |
|-------------------|------|-------|-------|-------|-------|-------|
| 95 | 0.84 | 1.15 | 1.65 | 2.32 | 3.06 | 3.48 |
| 150 | 1.8 | 2.43 | 3.48 | 5.06 | 6.54 | 7.6 |
| 205 | 3.06 | 3.58 | 6.12 | 8.75 | 11.4 | 13.19 |
| 260 | 4.75 | 6.54 | 9.5 | 13.71 | 17.83 | 20.78 |
| 315 | 7.07 | 9.6 | 14.03 | 20.26 | 26.58 | 30.91 |

* Energy savings based on installation of 25mm thick pad, ambient temperature of 18°C and zero wind speed.

Effect of Wind Speed

The table below gives the approximate effect of air movement on heat loss.

| Wind Speed km/h | Additional Heat Loss | Wind Speed km/h | Additional Heat Loss |
|-----------------|----------------------|-----------------|----------------------|
| 11 | 16% | 33 | 156% |
| 22 | 116% | 55 | 218% |



Annual Natural Gas Savings

= 6.12MJ x 8760hrs x 1/.80 efficiency
= 67,014 MJ/ year

Annual Dollar Savings

= 67,014 MJ x \$0.022
= \$1474.31 per 150mm gate valve.

Payback

= \$1474.31/12 months
= \$122.86 per month
= \$692.00/ \$122.86

Payback 6 months

Annual Gas Savings wind speed 22km/h

= 67,014 MJ + (67,014MJ*116%)
= 144,750 MJ/ year

Annual Dollar Savings

= 144,750 MJ x \$0.022
= \$3184.50 per 150mm gate valve.

Payback

= \$3184.50/12 months
= \$265.38 per month
= \$692.00/ \$265.38

Payback 3 months



The guide below is the **approximate payback time in months** after installation of a Insulock manufactured Thermocover. Average payback is based on the cost of installing a 25mm thick Insulock Thermocover on an uninsulated gate valve with a continuous operation at 80% efficiency using Insulock's current pricing structure with a natural gas charge of 0.022 cents per mega joule.

Payback in Months

Ambient Temperature **18°C**

Windspeed **0 kmph**

| Operating Temp °C | 75mm 3" | 100mm 4" | 150mm 6" | 200mm 8" | 250mm 10" | 300mm 12" |
|----------------------|------------|-------------|-------------|-------------|--------------|--------------|
| 95 | 29 | 24 | 21 | 18 | 16 | 17 |
| 150 | 14 | 11 | 10 | 8 | 7 | 8 |
| 205 | 8 | 8 | 6 | 5 | 4 | 5 |
| 260 | 5 | 4 | 4 | 3 | 3 | 3 |
| 315 | 3 | 3 | 2 | 2 | 2 | 2 |



Payback in Months

Ambient Temperature **18°C**

Windspeed **11 kmph**

| Operating Temp °C | 75mm 3" | 100mm 4" | 150mm 6" | 200mm 8" | 250mm 10" | 300mm 12" |
|----------------------|------------|-------------|-------------|-------------|--------------|--------------|
| 95 | 25 | 21 | 18 | 15 | 14 | 15 |
| 150 | 12 | 10 | 9 | 7 | 6 | 7 |
| 205 | 7 | 7 | 5 | 4 | 4 | 4 |
| 260 | 4 | 4 | 3 | 3 | 2 | 2 |
| 315 | 3 | 2 | 2 | 2 | 2 | 2 |

Payback in Months

Ambient Temperature **18°C**

Windspeed **33 kmph**

| Operating Temp °C | 75mm 3" | 100mm 4" | 150mm 6" | 200mm 8" | 250mm 10" | 300mm 12" |
|----------------------|------------|-------------|-------------|-------------|--------------|--------------|
| 95 | 11 | 9 | 8 | 7 | 6 | 7 |
| 150 | 5 | 5 | 4 | 3 | 3 | 3 |
| 205 | 3 | 3 | 2 | 2 | 2 | 2 |
| 260 | 2 | 2 | 2 | 1 | 1 | 1 |
| 315 | 2 | 1 | 1 | 1 | 1 | 1 |

* These values were calculated using a computer program that meets the requirements of ASTM C 680 - Heat Loss and Surface Temperature Calculations. The energy savings is defined as the difference in heat loss between the uninsulated valve and the insulated valve operating at same temperature.