

Improving Boiler Insulation and Installing GEM Steam Traps deliver savings for GSK Parma

GSK Parma, Global Manufacturing & Supply

The case study outlines impressive cost and energy savings at Parma through a committed approach to reducing consumption. Through two projects, total financial savings of €182,600 (£158,862) per annum have been calculated and over 1,200 tonnes of CO₂ will be saved. Innovative steps taken include replacing failing inefficient steam traps with GEM Venturi Steam Traps, and improving the insulation of the boiler and associated systems.

Project 1 - Installing GEM Steam Traps

Steam traps are widely used at Parma and other GSK sites. Their functionality is to remove condensate, air and other non-condensable gases from the steam system without permitting the release of live steam. The traps retain steam for maximum utilisation of heat. They are a key requirement of any steam system ensuring efficient steam utilisation and good condensate management. Energy losses from steam distribution systems are considered to be one of the largest contributors to cost for industry.

At Parma, large maintenance costs were being incurred with the existing mechanical steam traps to ensure the effective removal of condensate and consequently an efficient production process. Condensate not extracted from the system can lead to poor heat transfer and potentially to water hammer problems.

After extensive assessments the engineering team opted to remove the poor performing steam traps and install GEM (Gardner Energy Management) Venturi steam traps.

Benefits of GEM Venturi Steam Traps

Instead of utilising a valve mechanism to prevent the loss of live steam, the GEM steam traps use the venturi orifice design to effectively drain condensate from the steam system. They operate by using the

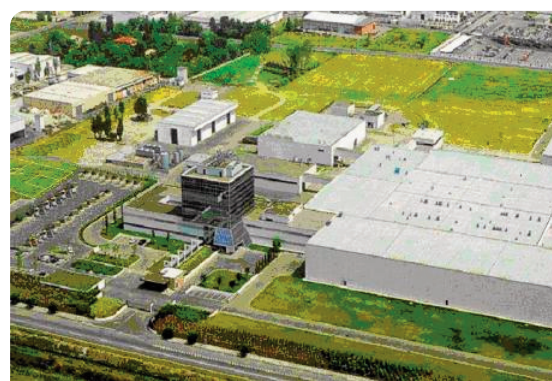
differences in density between steam and condensate.

Steam is 1000 times less dense than condensate, so at the entrance of the steam trap's orifice, the low density steam is squeezed out of the condensate. The high density low moving condensate is then preferentially discharged through the orifice, trapping the low density steam behind it.

Parma selected the GEM traps due to their greater efficiency and reliability over mechanical and thermostatic traps for removing condensate with minimal steam losses. With no moving parts to wedge open or fail they require minimal maintenance, thus reducing costs. The traps operate with a continuous discharge, rather than intermittent drainage (as with previous traps at Parma) ensuring condensate will not build up in the system causing problems such as corrosion or inefficient heat transfer. Importantly they have an increased control over heat output improving the production process.



GEM Venturi Steam Traps



Benefits

- Total calculated energy savings of 3,000,000 KWh per annum
- Total cost savings of €182,600 (£158,862) per annum
- Reduction in CO₂ emissions of 1,200 tonnes per annum

Outcomes

It is expected the GEM steam traps will be installed by December 2008. The initial investment costs were €110,000 (£95,700) while estimated energy savings of 2,500,000 KWh/yr are calculated.

Financial Savings

Calculated financial savings of **€156,000 (£135,720)** are predicted.

Payback periods

The payback period on installing the GEM steam traps will be approximately 9 months.

Carbon Savings

The reduction in CO₂ emissions is estimated at 973 tonnes per annum. The conversion factor used for gas fuel is 0.2

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“ Committed to reducing energy consumption and costs, Parma joined the Climate Change & Energy Reduction Program. The successful delivery of the projects outlined will help contribute to the GSK global targets of reducing energy consumption by 20 % by 2010 and reducing greenhouse gas emissions by 45 % by 2015. ”

Francesco Felicetti
Site Engineering Manager

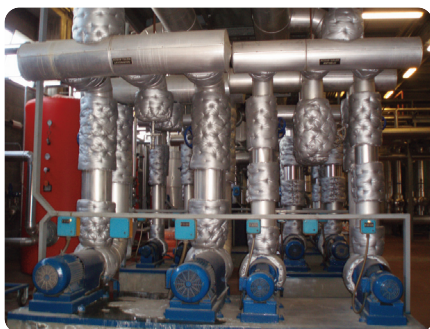
Project 2 – Improving Boiler Insulation

It was identified at Parma that the existing boiler and steam system was inadequately insulated. Large volumes of heat loss were being experienced impacting significantly on the site's energy consumption and costs. The efficiency of a boiler is imperative to the effective operation of the production process. For example it is crucial that the condensation created reaches the condensation chamber or de-aerator at the highest possible temperature to achieve maximum water feed returned back to the boiler.

The engineering team opted to upgrade the existing boiler insulation to reduce costs. This included insulating around the water distribution pumps, the main steam distribution system, the heat exchangers and the boiler. After extensive research Thermatras insulation was selected as the optimum material to use.

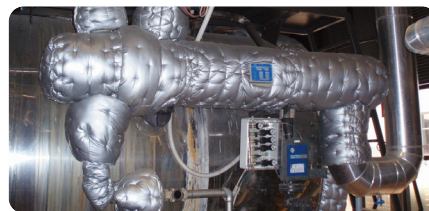
Benefits of Thermatras Insulation

The insulation was selected as it has the advantage of being made to specific size requirements and is ideal to cover areas that are difficult to access. Installing the Thermatras material meant the boiler and associated systems had a tighter fit of insulation with greater coverage of previously exposed surfaces. The insulation is in the form of cushions that fasten tightly around the equipment reducing unnecessary heat loss and conserving energy.



Thermatras Insulation

Thermatras insulation is manufactured from glass fabric with glass wool or Rockwool stuffing and stainless steel fastening hooks. It also has the advantage of reducing maintenance costs. Furthermore the insulation will help improve the safety and working conditions of employees, as a result of lower exposure to high temperature surfaces. At Parma the following specifications of Thermatras insulation were selected; 902 KK HTW 700 for the contact (inner) surfaces and 400 si for the outer layer.



Thermatras Insulation

Outcomes

The installation of the Thermatras insulation was completed in May 2008. The project was funded by the Climate Change and Energy Reduction program (CCERP) and cost €60,000 (£52,200).

Estimated energy savings of 500,000 KWh/yr are calculated.

Furthermore through the HVAC night shutdown project (in place since Q4 2007) an extra financial saving of €140,000 per annum has been achieved. Energy savings of 963,000 KWh/yr are calculated.

Financial Savings

Based on estimated methane gas saving of 83,395 m³ and an average natural gas price of 0.32 euros/m³ expected cost savings of **€26,600 (£23,142) per annum** are calculated.

Payback Period

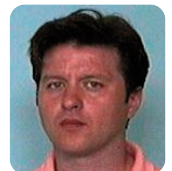
The expected payback period on the Thermatras insulation is calculated at 2.25 years.

Carbon Savings

The reduction in CO₂ emissions is estimated at 227 tonnes per annum. The conversion factor used for gas fuel is 0.2.

People Involved

The person involved in delivering both projects was Maurizio Rosa (Industrial Utilities Manager).



Future Prospects

GSK Parma are pro-active in their approach to reducing energy consumption. Establishing a site energy book has resulted in a series of innovative energy efficiency initiatives being undertaken. These include; lighting replacement; industrial steam monitoring; a HVAC performance survey; and thermo-graphic and ultrasonic detection of energy losses in compressed air, nitrogen system, boilers and steam pipelines.

Further information

Francesco Felicetti,
Site Engineering Manager,
GSK Parma, Via Asolana 90 43056 -
S.Polo di Torrile (PR)
Italy

T: +39 0521 526195
F: +39 0521 526117
E: Francesco.r.felicetti@gsk.com

David Featherston
Divisional Energy Manager
North Lonsdale Road
Ulverston
LA12 9DR

T: +44 (0)1229 482644
F: +44 (0)1229 482700
E: david.x.featherston@gsk.com

www.gsk.com