



HERTEL PLANT INTEGRITY

THE POWER TO SAVE ENERGY

STRENGTH IN PARTNERSHIP





GLOBAL PLAYER, LOCAL PARTNER IN ENERGY MANAGEMENT

Throughout the world, many companies in the industry sector are rapidly encountering the consequences of a scarcity of raw materials and materials, higher energy prices, water and waste issues and the need to reduce CO₂ emissions even further. National and local governments are imposing more and more stringent requirements and regulations, and the new ISO 50001 standard compels companies to make their energy management and CO₂ emissions visible. In industry, we see the reduction of energy consumption and energy efficiency as the most important measures for reducing dependence on fossil fuels and for reducing emissions. They are essential preconditions for the transition to sustainable energy management.

Our expertise

Industry often involves big numbers, sizeable energy consumption and large installations. Thanks to our years of expertise in this field, Hertel Plant Integrity is in a position to help companies gain an insight into the possibilities for reducing energy consumption and CO₂ emissions within their operating processes. In our analysis and recommendations, we flawlessly show the costs and the return on investment period that come hand-in-hand with the proposed improvements. This is how Hertel Plant Integrity Competence Centre supports companies in optimising their energy management and making their operating processes even more sustainable.

Sustainable solutions

Targeted, scientific studies have shown that approximately 620 PJ of energy are wasted needlessly in Europe through insulation deficiencies. This presents a major and profitable challenge for industry worldwide. Increasing the energy efficiency of processes can often be achieved with relatively minor steps. Hertel Plant Integrity is the perfect global partner, with expertise in the fields of thermography, energy appraisals and leak detection, to help you achieve these local aims. Combined with our vast expertise in the field of insulation, we are able to provide companies with high quality, sustainable solutions in the field of energy management.

RAPID PAYBACK

Tailor-made expertise

It is logical that Hertel is at the grassroots of introducing thermography into insulation technology. As may be expected from a leading company like Hertel, they are always on the lookout for improvements, new technologies and innovation of services. For example, measuring using infrared cameras is quicker, more accurate and easier than using 'more traditional' methods such as the contact thermometer and adopted as a standard. With thermography we can give our clients a clear picture of where their energy losses lie, what the options are for improvements, what the returns will be and the costs involved. Return on investment periods of less than one year are not unusual.

In recent years Hertel has gained extensive experience in the field of plant integrity, and as a leading player in the market we offer the following inspection and analysis services:

- thermography
- energy appraisals
- leak detection

Thermography

Hertel Plant Integrity carries out thermographic inspections using infrared cameras. The major advantage of thermography is that we can identify faults in systems at an early stage while there is no need to take the unit out of operation. This avoids unscheduled stops and unnecessary investments in

maintenance. In addition, safety standards are better maintained and the environment is spared.

Thermographic inspections can be undertaken within the scope of maintenance management or for activities such as determining heat losses, early localisation of defects and/or the detection of gas leaks. In the end, the goal is to reduce the maintenance costs as a result of lower energy consumption, for example, or to reduce losses due to gas leaks. Hertel provides advice on sustainable solutions for cold and heat insulation systems for sustainable energy management.

Hertel Plant Integrity specialises in analysing problems that occur specifically in processes in the heavy industry sector. A few examples of its investigations are:

- locating corrosion under insulation;
- determining the technical conditions of heat and cold insulation systems;
- investigation of the structural integrity of a concrete chimney;
- detection of burner misalignment in furnaces;
- detection of possibly asbestos containing insulation;
- detection of internal leaks in high pressure gas valves caused by condensation in gas;

- investigation of stress in pipe bends resulting from large fluid temperature variations;
- condition monitoring of refractory in high temperature furnaces;
- detection of flue gas leaks in steam boilers in power plants.

Energy appraisal

An energy appraisal is a measurement and calculation method used by Hertel to determine energy losses and the resultant CO₂ emissions in insulated and uninsulated parts of large industrial units. Achievable energy savings, CO₂ emission reduction and payback times are calculated when the system is insulated to required standards.

Gas leak detection

Special infrared cameras are available for measuring gas leaks. Hertel Plant Integrity uses the FLIR GF320 GasFindIR camera. From the images we can immediately determine the location of the actual leak.

INSULATION WITH ADDED VALUE

The new ISO 50001 standard will compel companies to make their energy management and CO₂ emissions visible. At the same time, they must produce reports to demonstrate that they are working on practical energy reduction. Thermography is an ideal tool for this! Combined with Hertel's specific knowledge of insulation

technology and the latest developments in insulation materials, much can be achieved, both financially and in terms of sustainability. Based on the plant integrity analyses we can calculate what the correct insulation is for both the short and medium term, and for the longer term. Achievable savings, investment costs

and return on investment are reported. Plant Integrity and Insulation is not just about the knowledge of materials but also structures, calculations, standards and legislation. We provide sustainable energy management solutions.

HERTEL, A FOUNDING PARTNER OF EIIIF



Hertel places great importance on sustainable business practices. This is why we are involved as a board member of the European Industrial Insulation Foundation (Eiiif). The Eiiif was set up to emphasise the importance of sustainable insulation for the entire industrial sector in Europe. Hertel was involved from the start of this foundation. Together with the Eiiif, Hertel strives to convince industry of the value and, above all, the profit of sustainable energy. Insulation is an excellent form of sustainable business practices. Sustainable insulation provides good energy and climate safeguards that can deliver annual savings sometimes equivalent to the energy consumption of 10 million households. Organisations can implement this savings potential effectively by repairing parts of industrial units that are not insulated or that are poorly insulated. In this way the costs of a one-time investment can often be recovered within one year.

- Sustainable business practices
- Sustainable insulation
- Founding Partner Eiiif
- Cost recovery period often less than 1 year.

TIPCHECK SAVES ENERGY AND REDUCES CO₂ EMISSIONS

Hertel's original ideas about insulation already included sustainable designs. This is why Hertel, together with Europe's major insulation companies, was one of the initiators in setting up the European Industrial Insulation Foundation (Eiiif). On behalf of the Eiiif, Ecofys carried out a study in 27 European countries into the scale of energy losses in industry. The outcome was a possible energy saving of 620 PJ. This saving is the equivalent of fifteen coal-fired power stations of 500 megawatts each. The potential reduction in CO₂ emissions is comparable to the emissions from eighteen million medium-sized cars, each travelling 12,500 kilometres per annum!

Developing and growing with the Hertel Plant Integrity Competence Centre

The results of the research led the Eiiif to develop the TIPCHECK programme (Technical Insulation Performance Check). As part of the programme, experienced engineers undergo thorough training to enable them to carry out energy appraisals (TIPCHECK) independently. These energy appraisals reveal actual energy losses and quantify potential savings. Carrying out energy appraisals ties in almost seamlessly with the new ISO 50001 standard which provides guidance for modern energy management. The engineers' experience is needed to guarantee the high standard of the energy appraisal. They have to know what is available in their field of expertise and to have sufficient knowledge of calculations, economics, sustainable design, materials, structures and practical uses. The Hertel Plant Integrity Competence Centre provides global starting points for combining development and learning, and working in daily practice: in other words, carrying out a TIPCHECK. In its TIPCHECK programme, the Hertel Plant Integrity Competence Centre is working to develop and grow the competences needed for the best integrated solutions for energy management.



PROJECT INTEGRITY IN PRACTICE

SUIKER UNIE

In energy-intensive sectors it is vitally important to minimise heat loss in order to control operating costs. For Suiker Unie, the Dutch sugar Producer, rising energy costs were the reason to end unnecessary heat loss in the plant in Vierverlaten in the north of the Netherlands.

In this plant, granulated sugar is produced from sugar beet. Lukas Rietsema, process engineering Team Leader at Suiker Unie explains, “A lot of energy is lost when extracting sugar from sugar beet. We thought that a thorough analysis of the process would perhaps reveal the best way to tackle the heat loss. When we presented these thoughts to Hertel, they suggested using thermal imaging to identify the weak spots in the process.”

Suiker Unie had actively sought ways of improving the efficiency of its production processes for a long time. One of these ways was to reduce energy consumption. While, the company has succeeded in reducing energy consumption by at least 42% since 1990, it believes that there is still scope for further improvement.

Solutions

Peter Stulen, head of the Plant Integrity department at Hertel, visited the Vierverlaten plant and identified 198 locations in the plant that could be used to analyse the problems. “To verify the findings and determine the heat loss correctly, it is vitally important that the locations where thermal images are taken are chosen with care. All aspects of the unit have to be included, such as the flanges, valves and pumps. These are frequently overlooked, even though heat is often lost here.”

The Hertel Plant Integrity team, that comprised Level 2 certified thermographers with TIPCHECK accreditation from the European Industrial Insulation Foundation (Eiif), used the 198 locations in the



Vierverlaten plant to chart the potential heat losses in 419 sections of the unit. These included the three boilers, evaporation and boiling pans, heat exchangers, pumps and valves.

Successes

Hertel's report outlined various solution scenarios based on different cost recovery periods (one, two or four years). Hertel's calculations showed that an investment of €84,000 in new insulation would deliver a saving of €37,000 per annum. The return on investment period would therefore be slightly more than two years. With these figures, Lukas could use Hertel's analysis to determine his own priorities. “It was extremely important that we had a clear picture of the investment returns that the recommendations from Peter and his

team would deliver. As our plant operates 150 days a year, we can carry out the work that is required during the quiet period next year. When we do so we will tackle the problems that are easiest to resolve first.”

Client:
Suikerunie

Country:
The Netherlands - Vierverlaten

Services:
Energy appraisal

Discipline used:
Thermography

ARCELORMITTAL

Missing or damaged insulating materials lead to an increase in operating costs, certainly in energy-intensive sectors. At a plant for coke by-products belonging to steel producer ArcelorMittal in Ghent in Belgium, the costs for the repair work to counteract heat loss were recovered in less than eight months.

Johan van de Vijver, the former manager of the by-products plant, had long suspected that the efficiency of the plant was in jeopardy as a result of heat loss. The cause of the heat loss, however, was not known. But the problem had to be tackled because of rising energy costs.

The by-products plant uses gas and steam to clean the gases from the coking plant. The cleaned gases are used by the company in other processes. Johan says “We wanted to analyse the plant, where temperatures can rise to over 180°C, to see where the problems were occurring. During consultations with Hertel on the best way to localise the heat loss, they suggested using infrared images.”

Peter Stulen, head of the Plant Integrity department at Hertel: “We thought that infrared thermography was ideal for identifying energy loss in the locations where insulating material was missing or damaged. We have considerable experience in analysing thermal images and an extensive knowledge of heat insulation. This allows us to not only calculate heat loss, but to also identify potential energy and cost savings by using the correct insulating material.”

Hertel's team, which comprised Level 2 certified thermographers with TIPCHECK accreditation from the European Industrial Insulation Foundation (Eiif) who are qualified to investigate the thermal performance of industrial insulation systems, took 37

thermal images at various locations in the plant. This allowed them to chart the 79 different sections in the unit. Each image contained enough information for three different measurements of valves, flanges and other fittings. Not only did this allow the ‘hot spots’ to be analysed, it also allowed the surface temperatures and the deviation from the expected performance to be calculated. The energy loss in kilojoules or monetary value could then be calculated.

Peter: “When we analysed the images, we quickly identified that most of the heat loss was occurring at the heat exchanger and in the pipelines. When it comes to locating problem areas, Hertel's expertise in the field of process engineering and in building and maintaining plants should not be underestimated. We quickly concluded that the valves and flanges were a potential source of heat loss. Insulating valves and flanges was not a priority when the plant was built in 1992. Times have changed where this is concerned.”

Hertel's calculations showed that fitting or replacing insulation in important parts of the installation could deliver energy savings up to €28,361 per annum. The cost recovery period was approximately eight months. Twelve months after completion of the insulation work, Johan had a clear picture of the energy consumption in relation to the preceding year. The total saving on the energy bill was €28,651, being €290 more than Hertel had estimated.

Johan is especially delighted with the result. “It was extremely satisfying that we were able to achieve this saving so quickly. A relatively small investment in the insulation delivers lucrative savings year after year.”

Client:
ArcelorMittal

Country:
Belgium - Ghent

Services:
Energy appraisal

Discipline used:
Thermography

Hertel Plant Integrity

Hertel B.V.
Welplaatkade 9
3197 KR Botlek-Rotterdam
P.O. Box 5190
3197 ZH Botlek-Rotterdam
T +31 10 295 82 22
F +31 10 295 82 41

Hertel Singapore Pte Ltd
16 Tuas Loop
Singapore 63734
T +65 6474 7818
F +65 6474 7817
W www.hertel.com

