

# TIPCHECK

Technical Insulation Performance Check

INSULATION SYSTEM · ENERGY EFFICIENCY · COST OPTIMISATION



**BILFINGER**

**INDUSTRIAL  
SERVICES**







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Dr. Rudolf K. Jürcke



Tobias Zaers

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# TIME TO ACT

Climatic change, scarce resources, energy efficiency and the reduction in CO<sub>2</sub> emissions are issues of key political and societal importance; at the same time, however, they also impact all modern industrial companies.

Dr. Rudolf K. Jürcke,  
Managing director of Bilfinger Industrial Services

Prices in the international energy market are rising, accompanied by growing dependence on energy imports and increasingly scarce energy resources. At the same time, the European Union has set the ambitious goal of reducing CO<sub>2</sub> output by 20 percent by 2020. Thus, looking forward over the coming years, energy efficiency and reduced CO<sub>2</sub> emissions will grow significantly in importance. In order to assist our customers in this area as well, we help them to take the measures needed to render their industrial assets as energy-efficient as possible. This gives rise to modern and economically efficient production plants which are competitive and preserve jobs. Modern insulation of process facilities harbours enormous potential for reducing energy consumption and CO<sub>2</sub> emissions.

The time has come to act – now.

Tobias Zaers,  
Executive Vice President Division Central Europe

Industrial insulation not only serves the purpose of supporting processes but also plays a crucial economic and ecological role. It makes a material contribution to reducing heat and energy loss and reducing emissions of greenhouse gases. The appropriate insulation is a simple yet effective and inexpensive way of boosting energy efficiency. This is because the cost of insulating industrial assets is frequently recouped within the space of only a few months – perhaps also at your company. We will be pleased to advise you and work closely with you on the best and most appropriate solution in the light of your specific requirements.

# GREATER **EFFICIENCY** – LOWER COSTS

An EU-wide study conducted by the European Industrial Insulation Foundation (EiiF) reveals the potential which can be harnessed through the efficient insulation of industrial assets.

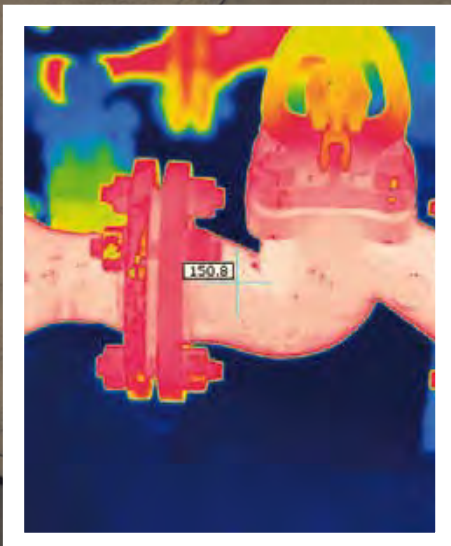
**If industrial assets throughout the 27 countries of the European Union were to be insulated systematically and effectively, the savings achieved would be equivalent to**

- the energy consumption of some **ten million households**, or
- the total annual energy consumption of **the entire Netherlands industry**, or
- the energy produced by **15 coal-fuelled power station** each with an output of 500 MW, or
- around **one third** of the CO<sub>2</sub> emissions produced by German road traffic.

To achieve sustainable energy efficiency, it is necessary to factor it in during the planning of industrial assets. However, the EiiF study shows that decisive mistakes are frequently made here: specialists in industrial insulation are only rarely consulted and antiquated standards for the configuration of technical insulation are thus often applied in the planning phase.

Sustained systems for insulating equipment pays off quickly particularly in the process industry and the energy production industry. In the case of energy-intensive processes involving very high or very low temperatures, the cost of technical insulation is frequently amortised within one year and sometimes even in the space of a few months.

In this way, operators of industrial assets benefit from heightened energy efficiency and lower energy and CO<sub>2</sub> costs. This simultaneously improves the production processes and ensures greater safety as contact risks are reduced. This makes the effective insulation of industrial assets an economically attractive and sensible investment.



Typical energy loss  
from an uninsulated valve.



# GOOD FOR THE CLIMATE AND YOUR BUDGET

What are the true advantages of effective insulation of industrial assets and where is the greatest potential to be found? Examples of successful projects show the inexpensive measures which can be taken to reduce energy consumption and costs in the long term.

**A thermographic examination of a chemical factory** during an EiiF TIPCHECK (see page 8) revealed that 35 tank roofs were not insulated even though the tanks held liquids with a temperature of 150° Celsius. The operator invested approx. EUR 100,000 on insulating the roofs.

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Annual savings:  
**EUR 500,000**

Annual reduction in energy consumption:  
**12,600 MWh**

**During maintenance work at a refinery**, a distillation tower was re-insulated in accordance with the latest scientific finds. In this connection, the thickness of the insulation layers was doubled in accordance with the calculations performed by the EiiF TIPCHECK engineer, thus reducing thermal losses substantially.

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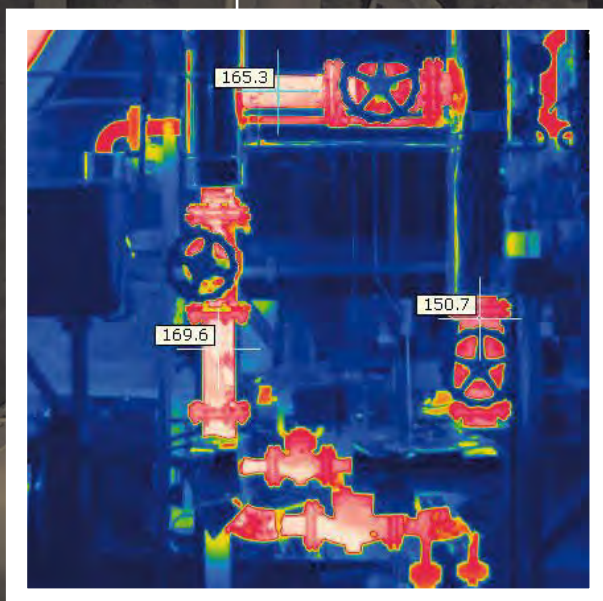
Annual savings:  
**EUR 75,000**

Annual reduction in energy consumption:  
**2,020 MWh**

**For a customer in the process industry** in the Netherlands, employees of Bilfinger Industrial Services determined the savings potential which could be achieved by means of effective insulation of valves, flanges and steam pipes. In addition to thermal losses, our engineers also warned of the risk of injury as a result of burns, something which the operator had previously not been aware of.

Annual savings:  
**EUR 23,700**

Annual reduction in energy consumption:  
**950 MWh**



Exposed parts with temperatures of over 100 degrees Celsius mean a high risk of injury from burns

# TIPCHECK – ENERGY EFFICIENCY THAT **PAYS FOR ITSELF**

In 2011, Bilfinger Industrial Services established an independent and Europe-wide standardised energy efficiency consulting programme for industrial insulation in conjunction with EiiF and its members.

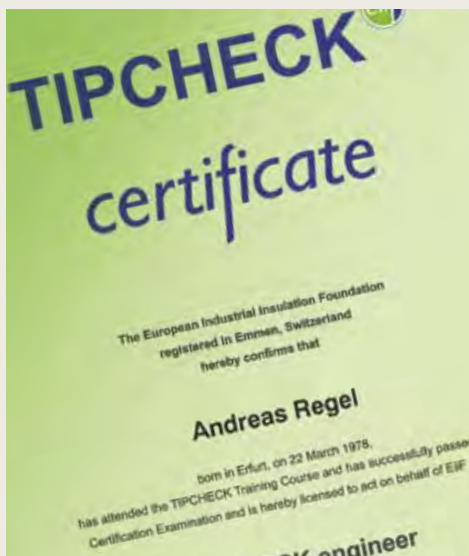
TIPCHECK stands for “Technical Insulation Performance Check”. TIPCHECK examines and analyses the following areas:

- potential for saving energy
- possibilities for improving processes and boosting efficiency
- minimising energy costs
- contributing to environmental protection by reducing CO<sub>2</sub> emissions
- detecting the risk of injury as a result of burns in the access areas, thus improving safety

The energy audits are conducted by EiiF-certified TIPCHECK engineers, who undergo specific training, allowing them to identify damaged or insufficiently insulated components and to calculate the energy-saving potential which can be harnessed by means of proper insulation. The purpose of a TIPCHECK is to identify the optimum insulation solution, i.e. the one which is the most energy-efficient and economically viable for the plant operator.

To achieve certification as a TIPCHECK engineer, participants must have more than four years of professional experience in the industrial insulation sector. The training course covers such subjects as materials science, particularly the science of insulation materials, the calculation of thermal losses and amortisation, process technology and practical thermography.

Our TIPCHECK-certified engineers will be pleased to help you lower your energy consumption and, hence, also your operating costs.







# TIPCHECK – REDUCING ENERGY LOSSES AND MORE

In addition to analysing the potential for boosting energy efficiency, TIPCHECK can also identify safety risks (personal protection) and technical defects such as corrosion. With TIPCHECK, you not only save energy and money but also enhance your plant availability.

## WHAT TIPCHECK MEANS FOR YOU:

### Meeting with the plant operator

Relevant plant data is collected, contact persons at the plant named and specific safety matters clarified.

### Analysis of the existing situation

The insulation currently fitted to piping, valves and tanks including heat bridges is analysed on site. Measurements are made by means of thermographic cameras; surfaces and refrigeration units are inspected using a humidistat.

### Evaluation of data recorded and calculation of current thermal losses

The operating parameters and data measured is imported into our thermal calculation program and a report produced on each part of the plant examined including a report on heat bridges. The results are summarised and the total thermal losses identified are listed.

### Proposal of improvements

Recommended improvements such as additional insulation, dismantling and re-assembly of the insulation with different strengths or reduction of heat bridges by means of suitable insulation systems are checked and evaluated. This is accompanied by amortisation calculations.

### Presentation of the results

The TIPCHECK report is presented to the customer and explained step by step.

Thus, the TIPCHECK not only analyses the actual situation but also provides a carefully calculated outlook specifying the savings which can be expected from optimised insulation.

When can we help you to lower your energy losses?  
Our certified TIPCHECK engineers will be pleased to submit a proposal for this service.



## TIPCHECK REPORT

The detailed report provides a deviation analysis of all thermographed parts of your plant. In this way, TIPCHECK engineers are able to make precise calculations of the savings potential and submit recommendations on ways of reducing CO<sub>2</sub> emissions.

The report documents:

- current thermal loss
- optimised thermal loss
- potential for saving energy
- economic viability
- amortisation



# INSULATION: THE AFFORDABLE AND FEASIBLE SOLUTION WITH IMMEDIATE EFFECTS

No company can afford to waste precious energy by neglecting to install adequate insulation. However, this calls for investment in the necessary optimisation and new insulation.

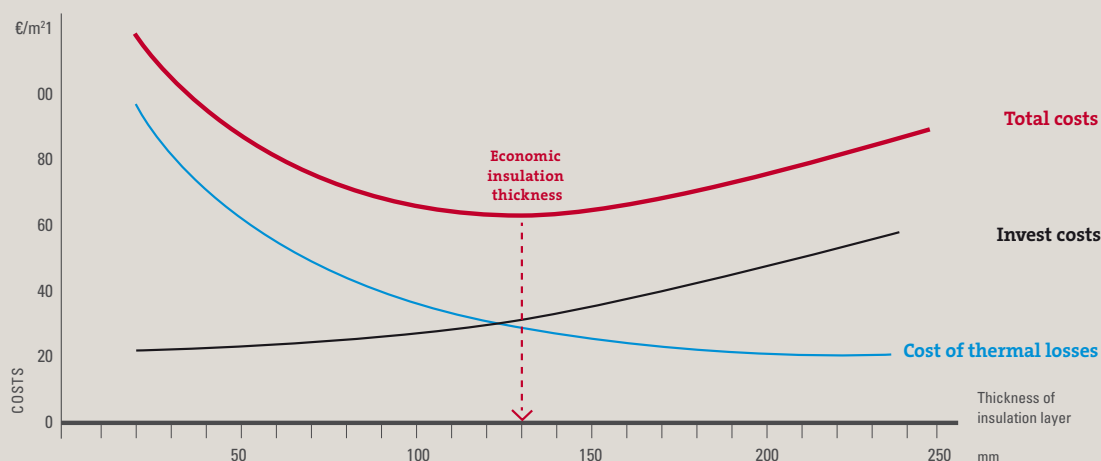
One of the key parameters for a business decision on the execution of insulation work concerns economic insulation thickness. This comprises the *once-only cost* of assembling the insulation and the annual reduction in thermal loss costs which can be achieved *across the lifetime of the plant*. Economic insulation thickness is the minimum of the sum total of capital spending and heat loss costs. This is shown in the diagram below.

Our TIPCHECK engineers can calculate economic insulation thickness for a certain period of time so that a fixed amortisation period can be defined.

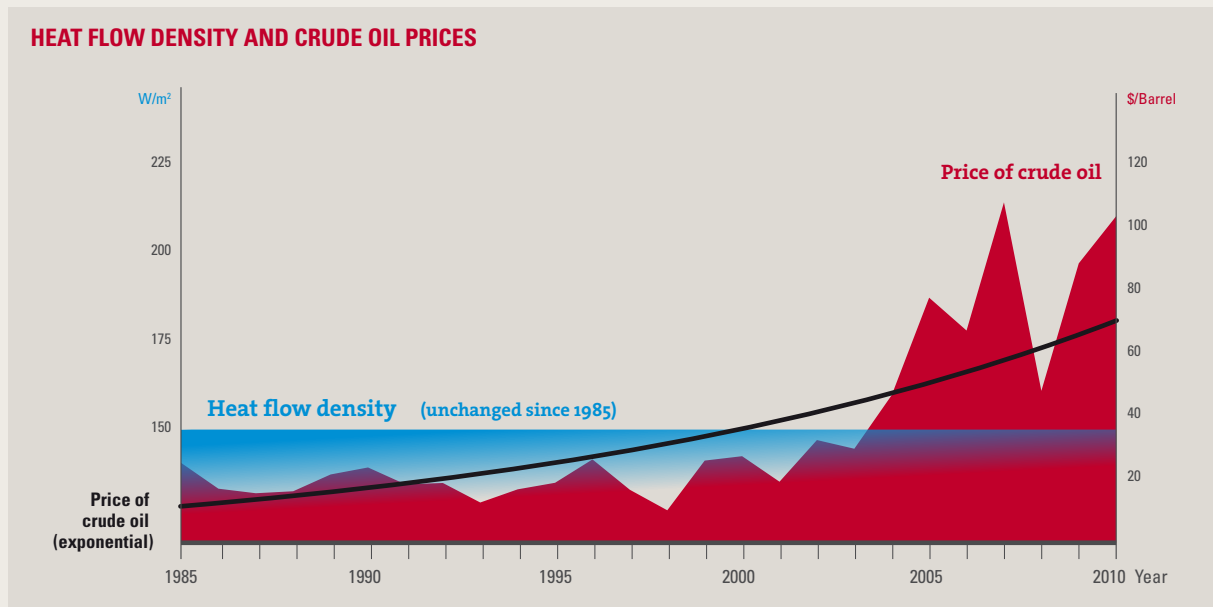
The diagram shows very clearly that insulation immediately helps to reduce energy cost and thus constitutes an effective means of improving the energy efficiency of industrial assets.

Improved insulation can also help to reduce the CO<sub>2</sub> emissions of your plant. Whereas other methods for reducing CO<sub>2</sub> emissions are frequently very cost-intensive, a study conducted by McKinsey in June 2008 reveals that savings are possible after the preliminary assembly of insulation thanks to the optimised use of energy.

EXAMPLE DEPICTION OF THE COST FUNCTION FOR THE THICKNESS OF THE INSULATION LAYER







# SPENDING **SENSIBLY** – SAVING MONEY IN THE LONG TERM

It is high time for companies to modernise their insulation systems.  
After all, the market is changing.

Whereas heat flow density for power station components has been set at 150 W/m<sup>2</sup> since the mid-1980s in accordance with AGI worksheet Q101, the price of crude oil has risen almost five-fold since then.

This has drastic consequences for companies: The hitherto customary heat flow density is no longer sufficient as *constant thermal losses are becoming increasingly more expensive*. This means that modern plants must be recalculated so that they meet the applicable operating requirements as well as satisfying economic criteria. This includes the capital recovery period, i.e. the period in which the cost of the insulation is recouped by the savings derived from reduced thermal losses resulting from the insulation. It is at least as important to calculate in each individual case the specific optimised heat flow density and, thus, the economic insulation thickness.

The standard figure of 150 W/m<sup>2</sup> is totally antiquated and no longer in keeping with contemporary requirements. It is not a suitable benchmark as oil prices and, hence, fuel costs have been rising significantly for years. Using antiquated parameters such as 150 W/m<sup>2</sup> is thus quite simply a waste of time and effort. Consequently, ever higher amounts of money must be spent on covering energy requirements today.

## THE INSULATION SOLUTION:

The efficiency of insulation systems can be optimised economically for all types of plants and processes, allowing energy consumption and costs to be reduced.

# THE RIGHT SKILLS ARE DECISIVE

At Bilfinger Industrial Services we are committed to providing you with the best possible services and solutions. To this end, we keep abreast of the latest developments at all times and endeavour to constantly enhance our products and services. One aspect of this is our involvement in associations and initiatives dedicated to insulation and energy efficiency.

Bilfinger Industrial Services is a **founding member of the European Industrial Insulation Foundation (EiiF)**. Organised as a non-profit foundation, it is committed at an international level to promoting the use of efficient insulation systems in industrial plants and related areas in the interests of reducing energy consumption and CO<sub>2</sub> emissions. The foundation's primary task is to communicate the potential offered by efficient insulation to decision-makers in politics and industry and to initiate energy efficiency projects. This it does in the realisation that despite calls for environmental and sustainable energy supplies the role of energy efficiency as a "fifth source of fuel" is frequently overlooked.

In addition to EiiF, we are also members of the German Federal Construction Industry Association (BFA WKSb). We also support the research projects conducted by

Forschungsinstitut für Wärmeschutz e.V. Munich (Institute of Thermal Insulation Research, FIW), which studies thermal losses from pipe supports among other things, as well as the work performed by the Association of German Engineers (VDI).

All these initiatives are consistent with the way in which we see ourselves, namely as a provider of high-quality services. On top of this, they are particularly welcomed by our customers. This is the only way that we can be sure of providing the best-possible quality in accordance with the applicable DIN, AGI and VDI rules as well as our own standards with the support of our highly qualified employees. In this connection, we assemble insulation for new construction and conversion projects as well as handling repairs and maintenance activities.



## SOME OF THE INDUSTRIES IN WHICH WE WORK:

- Pharmaceuticals
- Food industry
- Manufacturing industry
- Paper industry
- Power production
- Chemical and petrochemical industry







Interview with Andreas Gürtler, director of the European Industrial Insulation Foundation (Eiif).

**Mr. Gürtler, the Eiif was established in 2009. What are your foundation's objectives?**

A. Gürtler: Our goal is to identify the savings potential which can be harnessed by insulating industrial assets and to offer solutions.

**In Germany, for example, the Energy Savings Ordinance clearly stipulates the actions to be taken. So why is a foundation additionally required?**

A. Gürtler: This German ordinance applies only on a national level and only to buildings. There is quite simply nothing comparable for industrial assets. In addition, companies have previously not had any neutral source of information on how to save energy the most efficiently.

## "LARGE SAVINGS CAN BE ACHIEVED BY INSULATING INDUSTRIAL ASSETS"

**How do you identify this potential?**

A. Gürtler: We provide information on best practices and have also conducted an EU study with which we commissioned the renowned Ecofys institutue. The results clearly indicate the vast volumes of CO<sub>2</sub> which can be avoided in industry. (see page 4 for more details).

**Eiif certifies TIPCHECK engineers. What exactly does this entail?**

A. Gürtler: TIP stands for "Technical Insulation Performance". The TIPCHECK engineers generally have a degree in engineering and at least four years of industrial experience. They receive training from international experts using a standardised European-wide process, allowing them to neutrally analyse the savings potential of industrial assets. They develop economically viable insulation plans, allowing companies to reduce their CO<sub>2</sub> emissions and cut energy consumption and costs in the long term.

**Given the enormous competitive pressure, is it even viable for industrial companies to invest in insulation?**

A. Gürtler: In view of the very short amortisation periods of less than one year or even only a few months in some cases, economic and energy-efficient insulation solutions provide all companies with a clear competitive edge, allowing them to lower their operating costs and to simultaneously ease the strain on the environment. This is a wise imperative for any responsible company.

Andreas Gürtler, is the director of the European Industrial Insulation Foundation (Eiif). He was materially involved in the establishment of the foundation, which has been in operation since 2009.

Further information on the Eiif can be found at: [www.eiif.org](http://www.eiif.org).



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