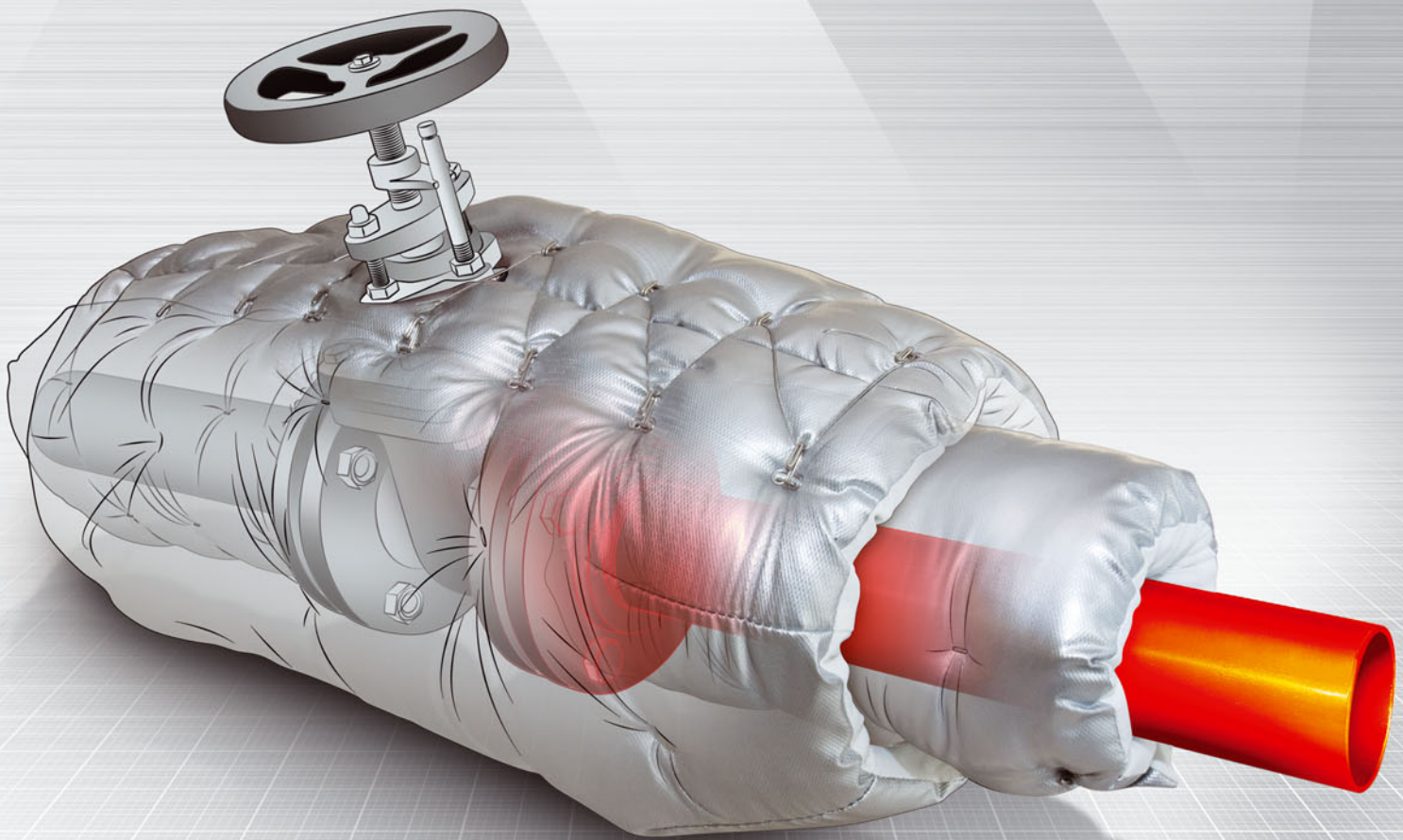
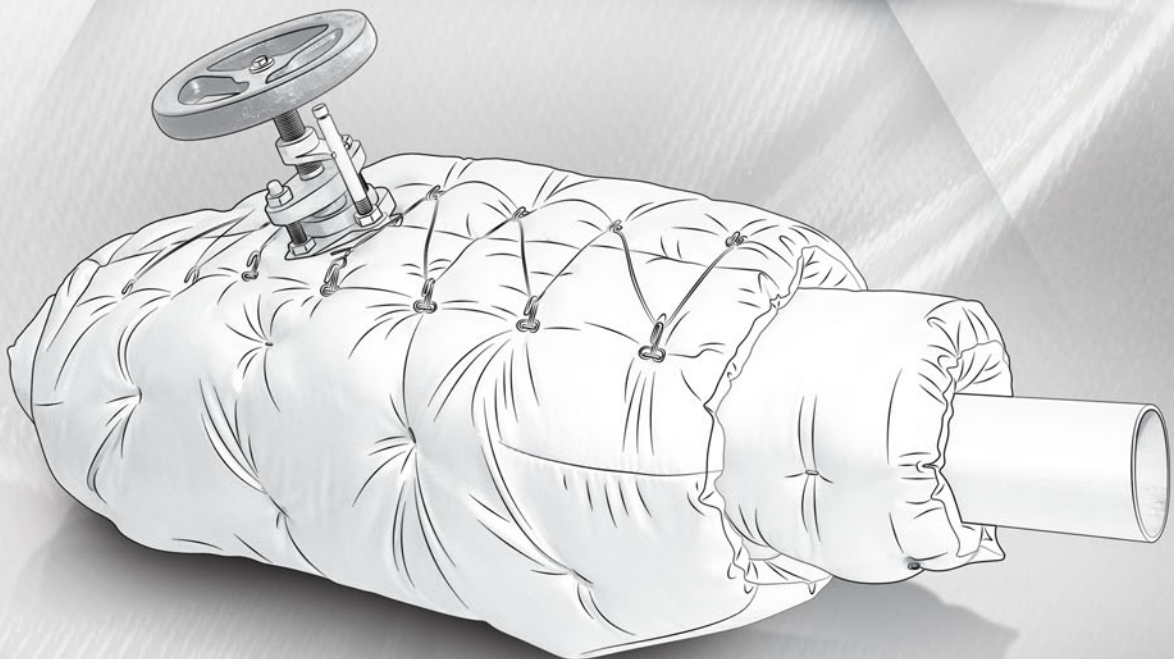
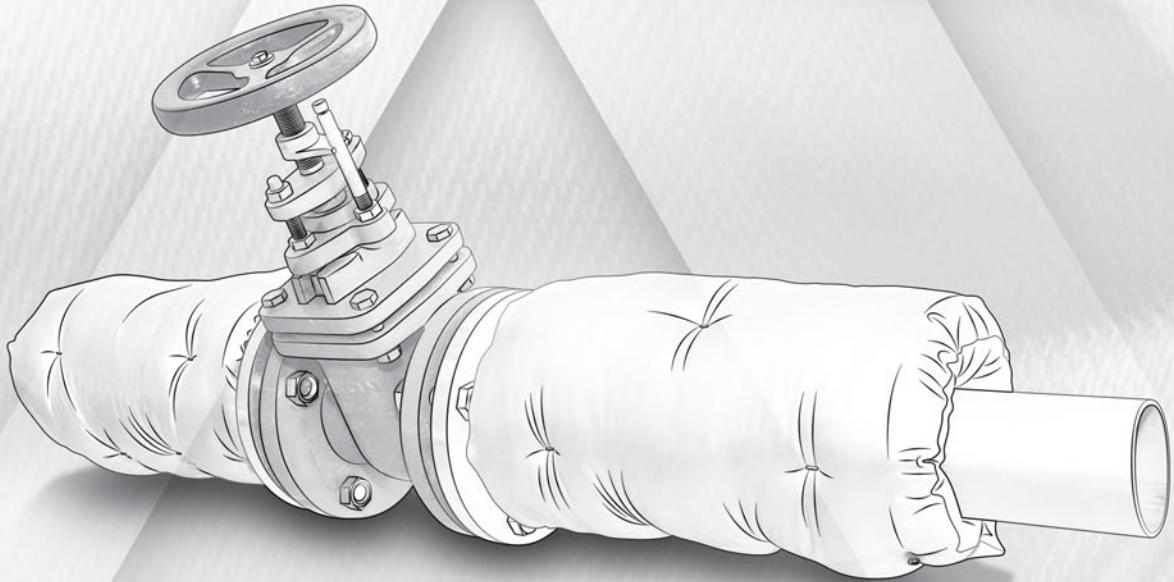
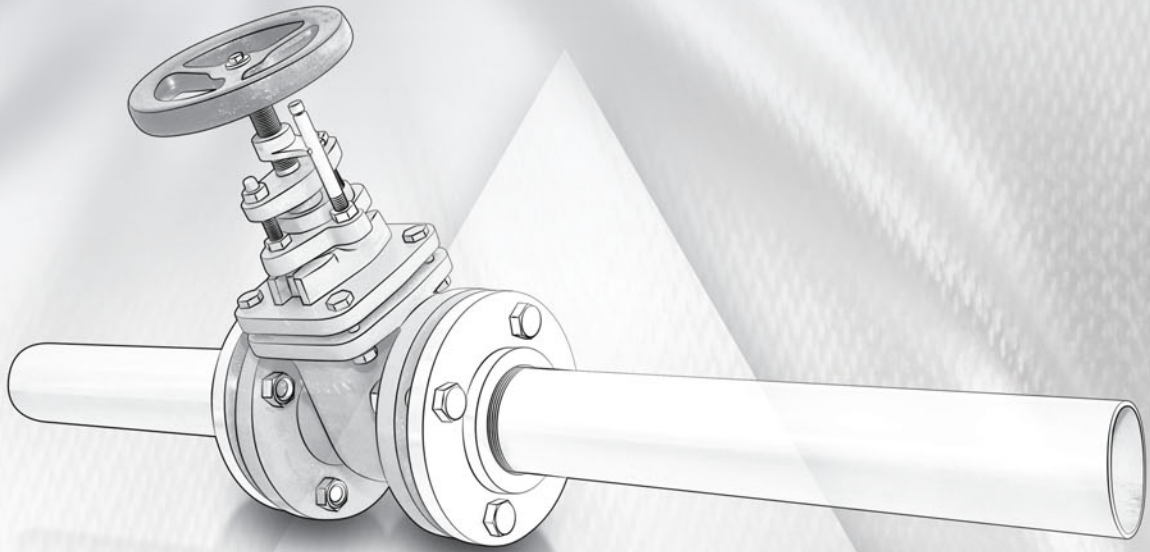


Thermatras[®]

The new perspective on insulation ~ Saving the environment



www.thermatras.com

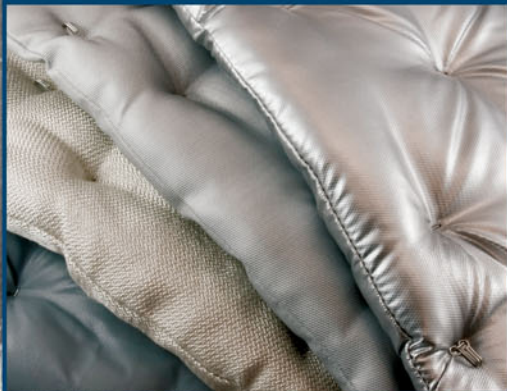


Who is Thermatras



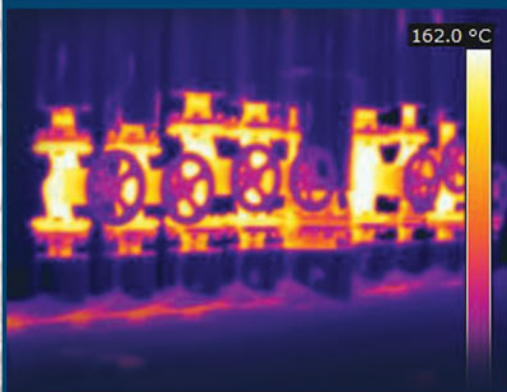
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Short description of Thermatras® insulation blankets

Thermatras® is a company which specialises in measuring, producing and installing thermal insulation in the form of durable insulation blankets. In 1992, Thermatras® became independent of Ajax Brandbeveiliging of Amsterdam.

Since the separation from Ajax, **Thermatras®** has grown into a close-knit team of about 35 experts and skilled employees with more than 40 years experience in the business of insulation.

Our modern premises in Barendrecht are situated close to Rotterdam. **Thermatras®** serves the insulation requirements of a wide range of companies, institutions and organisations. We deliver custom made insulation for various applications both at home and abroad.



DE BOER'S FABRIEKEN N.V. VAN ASBEST-,
RUBBER- EN BRANDWEERMATERIAAL



De Boer Isolatiewerken B.V.



History of Thermatras® insulation blankets

N.V. Noord-Hollandsche Astbestfabriek, formerly J. DE BOER & Co, was established in 1910 in Amsterdam and started out as a small company producing asbestos and insulation. Later the production expanded to include rubber hosing and general fire fighting equipment.

Mid 1925 saw the name "Ajax" being added to De Boer in recognition of Jan de Boer's son being goalkeeper for the first team of Ajax Football Club. Until 1991, there were two departments at the Amsterdam, Rotterdam and Eindhoven branches: Ajax De Boer Isolatatie B.V.Plc and Ajax De Boer Brandbeveiliging B.V.

In 1991, insulation activities at the Amsterdam and Eindhoven branches were sold off and with them the name "De Boer". The insulation department in Rotterdam was retained and given the name "Ajax Thermatras".

Geert Norder joined Ajax De Boer Isolatiewerken B.V. in 1964 as an apprentice insulator in the shipping sector. From there he worked his way up to foreman and in mid 1990 he was promoted to branch manager. On October 1st 1992 he took the opportunity, together with his son Alexander Norder, to form an independent company with the insulation department through a management buy-out.

Shortly after this, the company became known as **Thermatras®**, breaking its ties with Ajax De Boer.

When they moved to their new premises in Barendrecht, **Thermatras®** chose to review their logo and house style. The name Thermatras was combined with the Greek letter D (delta). This gave rise to the combination Delta T, the conventional symbol for differences in temperature. When calculating energy savings, Delta T is used to indicate the difference in temperature between the insulation medium and the ambient temperature. The colours and fonts used have a clear and obvious influence on the logo and house style.

The colour blue evokes the insulated cooling that the blankets provide on the outside while at the same time blue reflects the business decision to opt for energy savings.

The pay-off line under the logo serves to clarify the product and emphasises the innovative, durable and energy saving properties of Thermatras® insulation blankets.



Thermatras®
The new perspective on insulation ~ Saving the environment

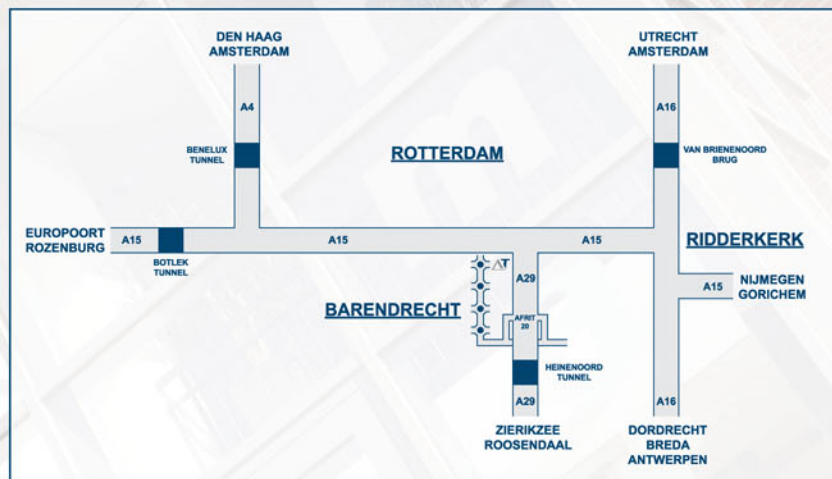


Thermatras® company location and support services

The Rotterdam branch of De Boer Isolatiewerken B.V. started out on the Boezemsingel, from there it moved to the Waalhaven, and then on to Barendrecht half way through 1987. After the management buy-out, Thermatras® set up its production unit in Oud-Beijerland, which doubled in size after a few years.

This expansion combined with space restrictions in Oud-Beijerland prompted the decision to consider looking for a new building. This would allow for optimum use of the entire business premises in terms of both lay out and business activities. A location for new premises was found in Barendrecht at Vaanpark 4. In May 2009, it was duly occupied.

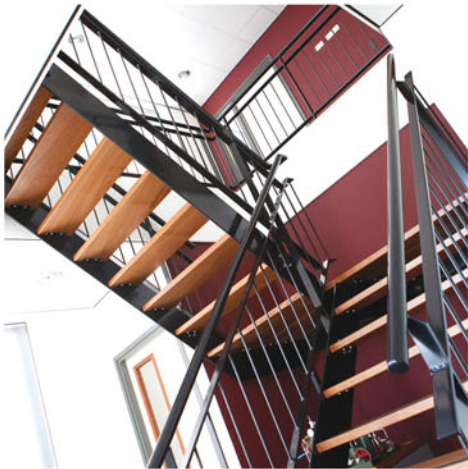
Industrial park Vaanpark 4 is particularly easy to access. It lies directly adjacent to the A29 highway (Rotterdam – Zierikzee) and by taking exit 20 (Barendrecht / Heerjansdam / Carnisselande) within no time you will be in Vaanpark 4. Its location on the A29 also offers a perfect connection to the 'Rotterdamse Ruit' (the A16, A4, A20 and A15 junction). The Hoeksche Waard and areas beyond are easily reached via the Heine Noord Tunnel.



Thermatras®' modern premises comprise two storeys. The ground floor consists of approx. 1,000 m² of production area combined with a small stockroom and despatch section. Both the working environment and technical equipment, are modern and cutting edge. This makes for the most efficient possible production processes, optimising product quality, lead time and capacity.

On the first floor there are a number of offices and meeting rooms as well as the company canteen, the presentation room and the training room. Positioning the canteen on the first floor was a conscious decision aimed at enhancing the interaction and development of the whole Thermatras® team. Production and office personnel have personal contact with each other in this way, encouraging mutual relationships and involvement.

The modern presentation and training rooms are fitted with up to date audiovisual equipment so that both internal and external staff can be trained. In this way product knowledge is effectively improved.



Thermatras® company structure

The board of Thermatras B.V. comprises Geert Norder Sr and Alexander Norder. The company is further divided into four departments, namely: sales, admin, production and fieldwork. **Thermatras®** has approximately 35 skilled employees from various ethnic backgrounds who together form a close-knit, multicultural team.

Frequent internal training ensures that personnel are multifunctional and that the expertise and specialist knowledge within **Thermatras®** continues to grow. The team of specialists is extremely flexible, ensuring that your problems and queries are addressed enthusiastically and effectively.

Safety, Health and Environment Checklist Contractors (SCC)

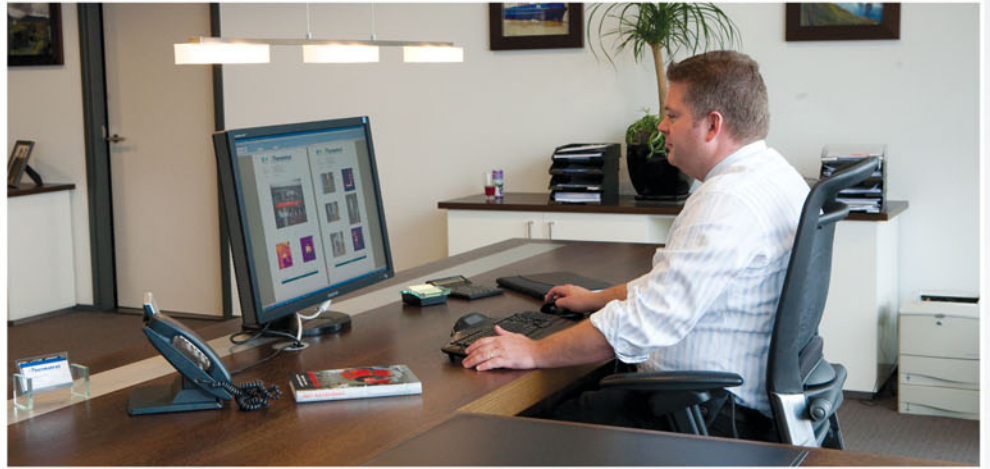
Since 1997, **Thermatras®** has been SCC certified. The SCC system was principally developed to assess companies that provide services to the petrochemical and chemical industry in an objective manner, and to certify their SCC management systems. The SCC is a yardstick for these contractors' SHE management systems. The SCC system is controlled by the SSVV, the Foundation Cooperation for Safety, an independent foundation.

The insulation business

Thermatras® has been a member of the VIB, the Dutch Insulation Association, since 1994. This association was set up in 1931 by insulation companies that wanted to come together to promote their mutual interests. Since then the VIB has developed into an active, strong and independent industry organisation, by and for the members. The VIB strongly encourages the professionalism of its members. The VIB is co-founder of the information and advisory institute NCTI, a participant in the training institute OOI and involved in standardisation through the ISSO Foundation and CINI.

The CINI Foundation has compiled and published its knowledge and experience in the field of thermal insulation, and the standardisation thereof, in the CINI reference book "Insulation for Industry". In 2000, **Thermatras®** was directly involved in the workgroup "insulation blankets". CINI is a collaborative group of companies set up for the purposes of standardising thermal insulation for the industry. Contractors and clients work together to establish specifications. Over the more than twenty years of its existence, CINI has grown into a reputable institute with a widespread network within the industry, trade organisations and training institutes, going beyond to include government agencies and, for example, Novem and Senter. CINI works closely with clients, contractors, government agencies and educational institutes.





Various Thermatras® product application references

The applications for **Thermatras®** insulation blankets are very diverse. In effect, all problematic shapes and sizes in mechanical engineering installations can be insulated using insulation blankets. Thermatras® is mainly active in The Netherlands, Belgium, Germany and Italy, but also exports to other countries both within and beyond the EU.

Shipping

Rotterdam is the largest logistic and industrial hub in Europe. The port gives access to a European market of more than 500 million consumers. Rotterdam is one of the most important trade centres in the world. It handles around 400 million tonnes of goods each year. Every year 133,000 inland vessels and 34,000 ocean going vessels pass through Rotterdam's harbour.

Thermatras® insulation blankets were originally used in the shipping industry and we are still active in this sector to this day. Our clients include mussel cutters, inland vessels, chemical tankers, bulk carriers, dredgers, patrol vessels (harbour service, police, Department of Waterways, pilot ships), tug boats, service boats, pipe layers MV Audacia, MV Solitaire, MV Lorelay (Allseas Marine Contractors), crane ship Svanen (Ballast Nedam). Applications within the shipping industry are not restricted to Rotterdam. **Thermatras®** also serves shipyards and shipping companies in other locations within the Netherlands as well as in Belgium and Italy.

Food industry

Clients include: Heineken Breweries (NL/BE/ES), Alken-Maes Brewery (BE), Inbev Breweries (BE), Brewery Haacht (BE), Refresco (BE), Pepsico Looza (BE), FrieslandCampina (NL/BE) Coca Cola (NL), Alpro (BE), Danone (BE), Incopack (BE), Kraft LU General Biscuits (BE), Cargill (NL/BE), Beldem (BE), Puratos (BE), Belcolade (BE), Belgaarde (BE), Pepsico Veurne Snacks (BE), Masterfoods (NL/BE), Aviko (NL), McCain Foods (NL/BE), Farmfrites (BE), Farmo (BE), Danis (BE), D'Arta (BE), Verduyn (BE), La Corbeille (BE), Covameat (BE), Comeco (BE), Hendrix Meat Group (NL), Marine Harvest Pieters, Veos (BE), Algist Bruggeman (BE), Scana Noliko (BE), Verlirend (BE), Nestlé (NL/BE), Ad van Geloven – Mora (NL/BE), Astra Sweets (NL/BE), Perfetti van Melle (NL), R.V.B. Leaf Redband (NL), Jacque IJs (BE), Fratelli Sacca (IT), Salvo (IT), Zwanenberg Conserven (NL), Hero (NL), Frumarco (NL), Yakult (NL), Prochamp (NL), Heinz (NL).

Non-residential building sectors

Thermatras® has insulated the ancillaries in hundreds of central heating installations (in the Netherlands, Belgium, Germany and Italy) including in the banking industry, schools, universities and colleges, hospitals (more than 70) and university medical centres, psychiatric institutions (more than 60) and rehabilitation centres, nursing homes, accommodation blocks (more than 500), sheltered workshops, detention centres, hotels, museums, office blocks, municipal buildings, swimming pools (more than 30), recreation centres, military barracks, government buildings and many other buildings with central heating and steam installations.



Various Thermatras® product application references

Power Stations / incinerators / combined heat and power installations / generators

Clients include: Electrabel Doel (BE), Electrabel Langerlo (BE), Electrabel Vilvoorde (BE), Electrabel Kallo (BE), Electrabel Rodenhuize (BE), E.ON Capelle aan den IJssel (NL), E.On Rotterdam (NL), ARN Nijmegen (NL), ISVAG (BE), hundreds of combined heat and power installations and generators (NL/BE/DU/IT/DK).

Pharmaceutical industry

Clients include: Ajinomoto Omnicem (BE), Janssen Pharmaceutica (BE), Pfizer-Capsugel (BE), Genzyme Flanders (BE), Shering-Plough (BE), Alcon (BE), Terumo (BE), Glaxo-Smith-Kline (IT), Nordmark Arzneimittel (D), Abbott Medical Optics (NL), Teva - PCH Pharmachemie (NL), Tiofarma (NL), Medimmune Pharma (NL), Medtronic (NL).

Chemical industry

Clients include: Solvay (NL/BE/IT), Esso (NL/BE), Shell (NE), Lanxess (BE), BP (BE), Transfurans (BE), Total Fina (BE), Sadepan (BE), DOW (NL), Alco Bio Fuel (BE), Oiltanking Ghent (BE), Airproducts (NL/BE), Lyondell Basell (NL), Odfjell (NL).

Other industries

The areas in which Thermatras® is active are very diverse. They include the asphalt industry, calcium silicate and cellular concrete industry, metallurgical industry, rubber and synthetics materials industry, carpet industry, textile industry, storage and distribution companies, laundries, tank storage, surface treatment industry, animal feed industry, chemical industry, soap, laundry and cleaning agents, paint, varnish and printing ink, synthetic fabrics, fertilizer, synthetic scent and flavourings, power stations, incinerator installations.

Clients include: Eternit (BE), Promat (BE), Tessengerlo Chemie (BE), Recticel (BE), Duracell Batteries (BE), Panasonic Batteries (BE), Domo Fibres (BE), Utexbel (BE), Monks International (BE), DS Fibres (BE), Zwickauer Kammgarn (D), Crown General (BE), Beaulieu (BE), Ideal Fibres (FR), Bonar Floors (NL), Unilin Flooring (BE), Havep (NL), Puijenbroek (NL), Philips (NL), Forbo (NL), Xella Ytong (NL/BE), SIGMA Coatings (NL), Inkt Chemie (NL), ArcelorMittal (BE), Cehave Voeders Berghe (BE), Versela-Laga (BE), Goep Danis (BE), Hil's Pet Nutrition (NL), Teurlings (NL), Raiffeisen Kraftfutterwerke (D), TKV Regau (A), E.J. Bos Mengvoeders (NL), De Valk Wekerom (NL), Koudijs – Wouda (NL), Bandag (BE), Ford (BE), Vredestein (NL), Goodyear Aviation (NL), Nedcar (NL), Tenneco (BE), New Holland (BE), Meridian Magnesian (IT), Fiat Mirafiori (IT), Fiat Teksid Aluminium (IT), Oleon (BE), Duroc (BE), Van Genechten Biermans (BE), Smurfit Kappa (BE), Stora Enso (BE), George Pacific (NL), Kappa (NL), Coldenhove (NL), Belgonucleaire (BE), Kem-Products (BE), Procter & Gamble (BE), MC Bride Household (BE), Ecolab (BE), Pioneer (BE), Cytec (BE), EOC (BE), Henr Wintermans Cigars (NL), Fujifilm (NL), KLM (NL), Transavia (NL), Canon Europe (NL), TNT Post (NL), Yamaha Motor Europe (NL), etc.



Product description of Thermatras® insulation blankets

History of insulation blanket applications

The concept of "insulation blankets" is more than a century old. More specifically, blue asbestos cloth was first manufactured as a factory product in 1895 by the Cape Asbestos Company. Asbestos cloth is used to manufacture insulation blankets for steam turbine housings.

Since the '70s, the use of asbestos has been discontinued. It is forbidden by law to use asbestos in the Netherlands, but the concept of insulation blankets has remained the same despite this resolution. However, considerable innovation has taken place at **Thermatras®** in terms of the production process, the materials used and the measurement process employed.

Product description

Each and every **Thermatras®** insulation blanket is an extremely durable, made-to-measure product of the highest quality. **Thermatras®** insulation blankets are thermal insulators made of glass fabric, sometimes in combination with synthetic fabrics, filled with Rockwool insulation material, and they come with stainless steel fastening hooks. These hooks are connected to each other with stainless steel wire. To prevent the filling from shifting, the blankets are tufted. This is what gives them their characteristic blanket-like appearance.



Glass and synthetic fabrics

The choice of fabric depends on the following factors:

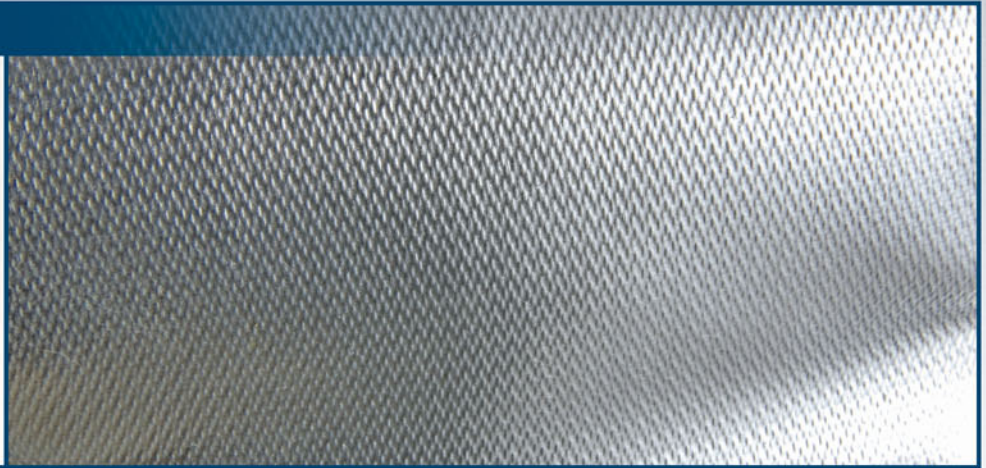
- The temperature of the object to be insulated (from 0°C to 1.000 °C)
- The medium used to heat the object (exhaust fumes, steam, thermal oil etc)
- The external circumstances where the object is located (damp, dirt, grease, dust, acids etc)
- The location of the project (inside or outside)

There is a wide range of glass and synthetic fabrics that can be used for all kinds of applications. The choice of fabric is determined by the properties of the fabric, the weight per m², the type of weave (the gauge and number of threads) and the finish.

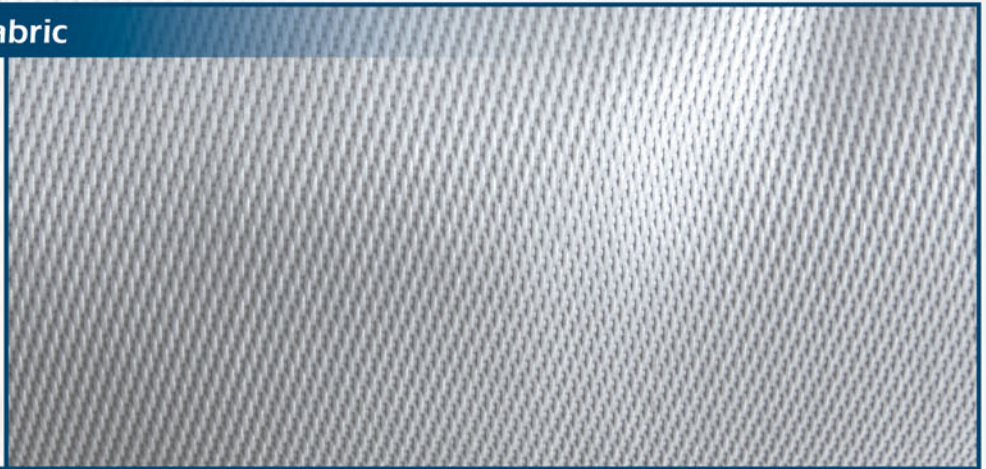
Glass fabric can have a finishing coating such as silicon, PU (polyurethane), PTFE (Teflon) etc. There are also glass fabric types that are covered in aluminium foil (cached) and fabric that is coated with a finish so that the resistance to temperature is increased and to stop the fabric from unravelling. A neutral fabric is often used for synthetic fabrics so that their specific properties are retained. Besides glass fabric, there are also special fabrics for temperatures greater than 500 °C, such as reinforced E-glass, silica fabric and ceramic fabric. These materials, however, are less commonly used.

Examples of Thermatras® insulation blanket glass fabric varieties:

Silicon coated glass fabric



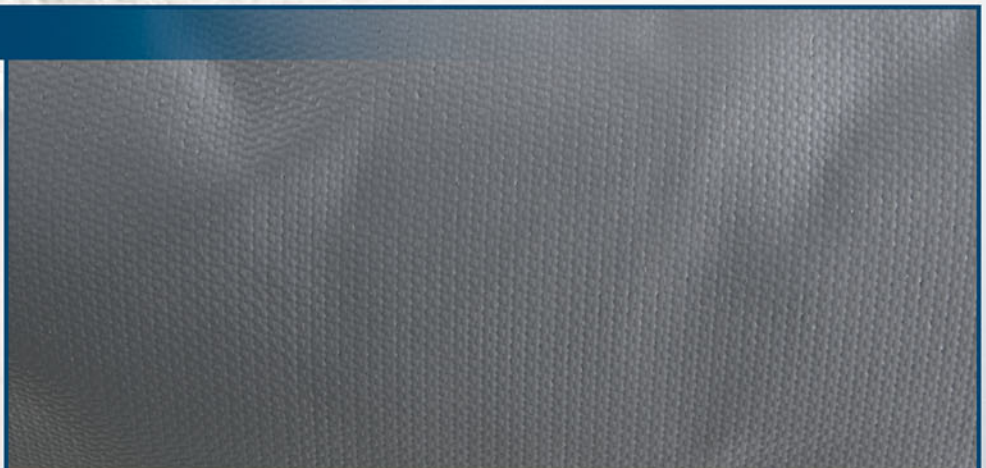
Polyurethane coated glass fabric



HT glass fabric



Teflon coated glass fabric



Product description of Thermatras® insulation blankets

Insulation blanket properties – Rockwool (mineral wool)

Fireproof

The Rockwool mineral wool used in **Thermatras®** insulation blankets is fully fireproof and withstands temperatures in excess of 1000 °C. When exposed to fire, the mineral wool structure stays intact. Rockwool mineral wool retains its insulating properties and protects the underlying structure. The fireproof Rockwool products do not cause fires nor do they contribute to fires that have already started. The spreading of fire can be prevented by the correct application of Rockwool mineral wool.

Thermal

Static air is the best natural thermal 'insulation material'. Mineral wool envelops static air and for this reason it has high value natural insulation properties. Since Rockwool products do not deteriorate with time, high quality and permanent insulation properties are guaranteed. Their fibrous structure ensures that the individual mineral wool sheets knit seamlessly together. Rockwool does not shrink or expand, and therefore these joints are guaranteed to remain seamless in the future. As a result gaps that allow cold air to penetrate are avoided.

Acoustic

Thanks to the unique mineral wool structure combined with its mass, Rockwool mineral wool has excellent acoustic properties. Its open structure also allows for high sound absorption. Rockwool mineral wool is perfectly suited for combating noise pollution.

Moisture absorption qualities

When submerged in water, Rockwool absorbs less than 1.0 vol % (1 mm per 10 cm). This was tested according to the British Standard BS2972. Within Europe, the general standard 'Products for thermal insulation for buildings – products manufactured using mineral wool (NEN-EN 13162)' will shortly come into effect. This standard dictates that mineral wool products may not absorb more than 1 kg/m³ of moisture. Rockwool insulation products for hollow walls and façades have already been tested according to this standard and they absorb less than 0.05 kg/m³!

Product safety

Using Rockwool mineral wool is a safe way to conserve energy. A warm and dry living environment is essential to good health. For thousands of years, cold and damp buildings impacted on the health of our ancestors. This remains the case for thousands of people around the world. Better insulation has improved the quality of life for millions of people around the world. These days people take a warm and dry home for granted. Mineral wool has been used for more than sixty years. It has proven itself to be a popular and safe insulation material and is probably one of the most documented and tested building materials available.



Product description of Thermatras® insulation blankets

World Health organisation (WHO)

Mineral wool is a safe product to work with. In the European Union in 1997 a statement was issued regarding the possible carcinogenic properties of mineral wool. For this, the European Commission issued European Guideline 97/67/EC which established that mineral wool as applied in buildings and industry is safe in its production and application. This fact is supported by the decision of the International Institute for Cancer Research (IARC) of the World Health organisation (WHO) to remove mineral wool from the list of 'possible carcinogenic components'. This conclusion rests on the fact that epidemiological research has not shown that exposure to mineral wool fibres in a working environment increases the risk of lung cancer, and that research has shown that there is not an increased risk of tumours as a result of long term inhalation.

Correct usage

Rockwool mineral wool is one of the safest materials when it comes to protection against fire or extreme heat. Approx. 98% of the product consists of inorganic (stone) material that cannot burn and does not produce smoke. Only 2% is organic: a small amount of oil used to make the insulation material water resistant and to reduce dust levels, as well as a binding agent of organic resin (phenyl urea) used to bind the mineral wool fibres. As is the case with all organic components, these materials can smoke and release components when heated. To cater for the unusual circumstances that arise when the insulation is heated to temperatures in excess of 90 °C (such as in industrial insulation for piping in electricity power stations), the Rockwool Group has published an information leaflet for product safety that recommends good ventilation during the initial heating phase. Under normal circumstances that prevail in buildings, such extra safety measures are not necessary.

Other insulation materials

For specific applications, alternative insulation materials may be required, such as glass fibre needled mat. Using these kinds of insulation material does have its restrictions, however, particularly regarding processing methods and the flexibility of the end product.

Insulation blanket fastenings

Thermatras® insulation blankets are fitted with stainless steel fastening hooks that are connected with stainless steel wire. This is an uncomplicated system that also ensures that awkward objects can be installed easily. For more specific applications, other types of fastenings can be used, for example stainless steel straps or Velcro closures. Using these kinds of closures does have its restrictions regarding flexibility and temperature limitations.



Production process of Thermatras® insulation blankets

Digitalising the measurements

In the design offices at **Thermatras®**, the design drawings and measurements are translated into final digital drawings. Special design software from the clothing industry ensures that the measurements for the insulation blankets are very precise. Using nesting, the patterns required are placed as efficiently as possible on the fabric to be cut, so that wastage through off-cuts is kept to an absolute minimum and raw materials are used sparingly.

Digital cutting

In Thermatras' modern studio, a digitally steered cutting machine (CNC) cuts the patterns on a 20 m² cutting table with millimetre precision. The blankets made of glass fabric and/or synthetic fabric are thus given their final form.

Stitching

Once cut, the pieces of fabric are stitched in our sewing studio according to pattern. In special cases, fastenings using Velcro or belts and buckles may be required. After the fabric has been stitched, the blankets go on to the next phase of the production process so that the seams are on the inside of the blankets.

Filling

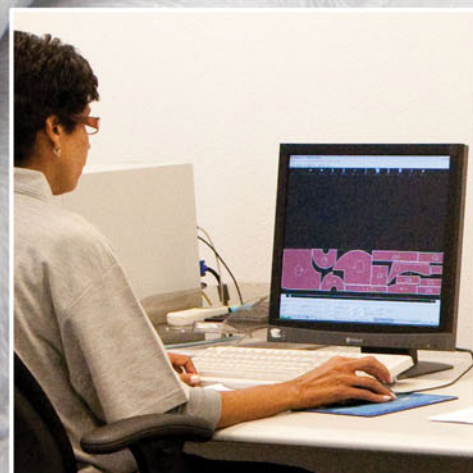
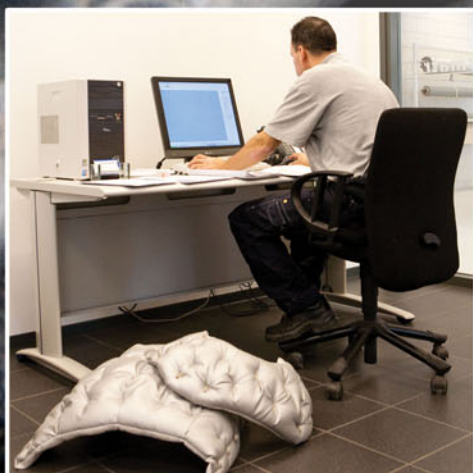
After stitching, the 'empty' **Thermatras®** insulation blankets are filled with mineral wool (Rockwool). This is done manually by skilled people so that the insulation is spread as evenly as possible. Insulation blankets are generally between 4 and 6 cm thick, although they may be thinner depending on their application. Different insulation material may be used in special cases.

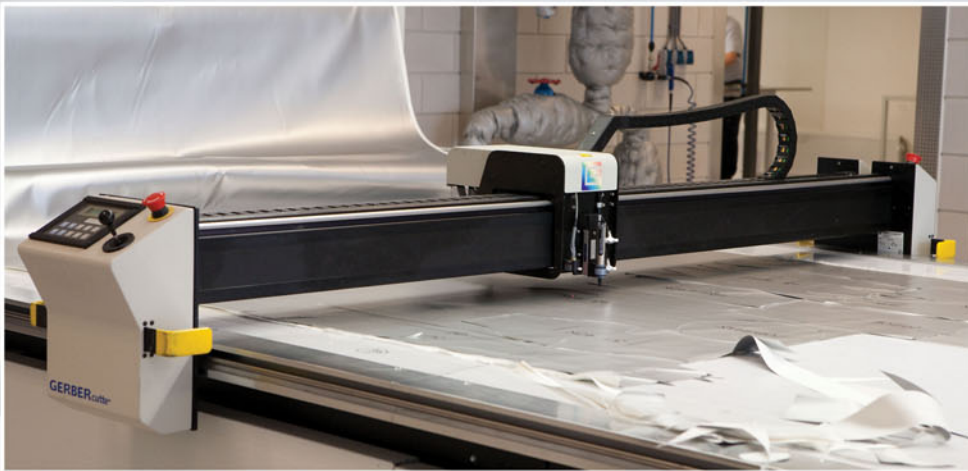
Tufting

Insulation blankets are tufted with stainless steel to prevent shifting of the mineral wool. The tufting is done using staples and a pneumatic tacker. The way the tufts are applied determines the final structure of the insulation blankets.

Hooks

Finally, fastening stainless steel hooks are attached to the insulation blankets. When the blankets are installed, the fastening hooks are linked by stainless steel wire. This is done in a similar manner to that of laces in hiking boots.





The various stages of ordering Thermatras® insulation blankets

Cost estimates

Insulation blankets can be used in a wide range of applications. Thermatras' offices include a department for planning and calculations where qualified and experienced staff serve and support our customers. Our calculations department issues quotations based on your queries and comments. For a large number of our clients in the shipping industry, for instance, immediate action is required to solve problems. This is organised by our planning department.

Cost-benefit analysis

For those installations that require a cost-benefit analysis, appointments are made with our sales department. This department comprises a team of technical commercial staff. After making an appointment, a member of staff will visit your premises to make a detailed inventory of the installation to be insulated. These staff members are not there just for the coffee, they are used to rolling up their sleeves and getting to work in often hot machine rooms so that they can determine what is viable in your particular case. Based on this information, you will be given a practical and detailed report containing energy saving facts and figures. This report is ideal for your internal budget calculations and can be used as a concrete yardstick from the point of view of environmental and health and safety considerations.

Measurements

Upon commissioning an order, our planning department makes an appointment so that the final measurements for the insulation blankets can be taken. As mentioned, our installers have to measure each piece of equipment separately after which they draft a production drawing. During this process, they take into account those areas where the insulation may have space restrictions, leaving recesses for nuts, gaskets and suchlike. Pumps, for example, are only insulated on the water side, leaving the fitting case on the pump housing free. In this way, a perfect fit is guaranteed, which is necessary for good insulation and easy maintenance.

Production process

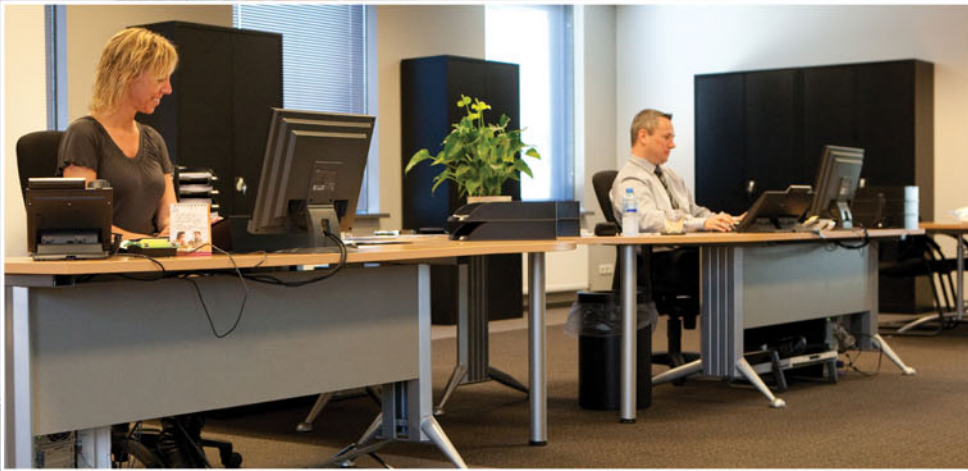
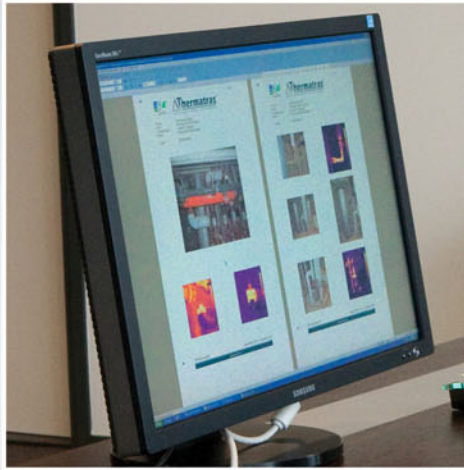
The detailed production process of Thermatras® insulation blankets as described above takes place on our 1,000 m² production floor. This area houses the design bureau, cutting room, sewing room, filling department, tufting and fastening, the despatch area and a storeroom. Our new premises provide a combination of proven technology and new technology including lighting, air conditioning, heating, ventilation and security. This gives our personnel a safe working environment where absenteeism is low and contented productive staff enjoy comfortable work surroundings.

Despatch and transport

During the production process, comprehensive quality controls are carried out. The final check takes place when the Thermatras® insulation blankets are packed. The blankets are inspected visually and compared to the original working drawings of the measurer. Subsequently the blankets are packed and each package is labelled detailing the project name, location and number.

Assembly

The only step that the client sees after the measuring process is the assembly of the insulation blanket. The numbered insulation blankets are mounted onto the various parts of the installation with corresponding numbers. This is done neatly and with precision. Because the insulation blankets are made-to-measure, assembly is a relatively easy business and can be carried out in a short space of time. The time spent by our skilled technicians on your installation is much shorter than it is for traditional insulation procedures. There will therefore be less disturbance from our technicians, both to people and processes, because the blankets are produced off-site.



Thermatras' ability to distinguish

A variety of different motives may prompt clients to choose insulation blankets. Costs savings, and therefore the bottom line, may well be the most important motive, but conserving energy and safety may also be factors. Controlling heat channels has become increasingly important. On the one hand this is because energy costs continue to rise, on the other hand controlling the temperature during industrial processes, as well as safety issues, are also becoming ever more demanding.

In order to set themselves apart in the insulation industry, **Thermatras®** offers its clients a complete range of products and services based on the following Unique Selling Points (USPs):

- **More than 40 years experience and product knowledge in the insulation sector**
- **A motivated team of skilled and flexible staff**
- **High production capacity in a modern, climate controlled facility**
- **Turn-key projects: no subcontracting of products or operations**
- **Good relations with suppliers and manufacturers**
- **Complete solutions for small and large insulation projects**
- **Innovative options regarding raw materials and equipment**
- **A fresh look at insulation and custom made applications**
- **Free energy scan of parts and equipment needing insulation**
- **Specialist in compiling energy saving reports**
- **Close collaboration with energy consultants, research institutes and energy related organisations**
- **An extensive network of satisfied and loyal national and international clients**
- **Market leaders in insulation blanket applications within the non-residential sector and industry**
- **Financially sound business operations**

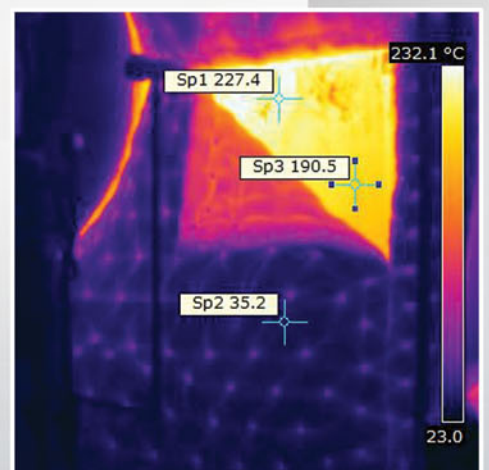
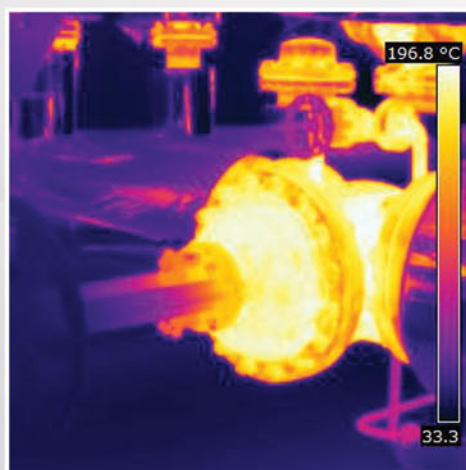
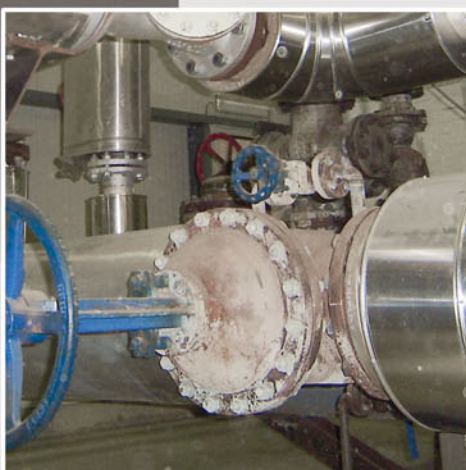
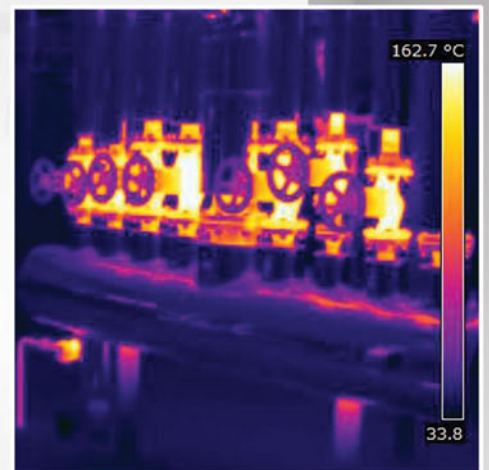
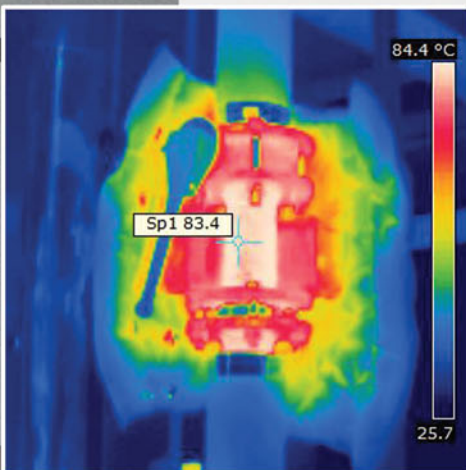
Heat loss detection using a thermographic camera

Thermographic cameras

A difficult aspect of heat control is that heat is invisible to the naked eye. Heat escapes unnoticed and it is not always easy to detect the places where it is leaking.

For their cost-benefit analyses, **Thermatras®** uses heat detection photos to make heat loss and temperature differences visible. These colour-coded images make it very obvious that using insulation blankets makes a huge difference to heat patterns.

Below are a few photos taken using a thermographic camera:



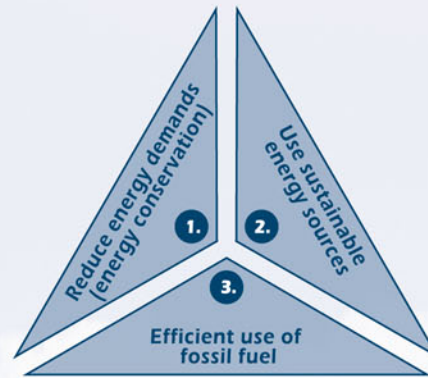
Energy savings using Thermatras® insulation blankets

Trias Energetica

Trias Energetica is a three-step plan intended to help companies, households and government institutions towards becoming climate-neutral.

The three steps are:

1. Reduce energy demands; energy savings through good insulation for example.
2. Use sustainable energy sources, for example: sun, wind and biomass-energy
3. Efficient use of fossil fuel: for example heat recycling installations.



Trias Energetica

Energy costs

Research shows that for every Euro spent on energy, 8 eurocents are wasted through pipes and equipment that are exposed or insufficiently insulated. Even where it 'looks' as though something is insulated, loss through heat leakage can be considerable. This can happen when sheet metal cladding come into contact with pipes or seals, leading to heat transmission. Hot spots can easily be found by touch or using a thermographic camera. A good way to prevent hot spots from forming is to use prefab insulation blankets. (from: Het Ketelhuis – productie en gebruik van stoom in de praktijk” – Author N.D. Duinkerken).

Good insulation can drastically reduce energy bills! This applies to both industry and non-residential buildings. It is incomprehensible that many companies invest heavily in heat recovery from exhausts and improvements to furnace operations, with costs that takes years to recover, yet these same companies show little interest in prevention of heat loss through bad or non-existent insulation of pipes, ancillaries and vats. Cost recovery on insulation takes months instead of years.

Heat transmission and heat resistance of Thermatras® insulation blankets

Heat transmission, k value, in $(H/(m^2.K))$, expresses the amount of heat per second per 1 m² per degree of temperature difference that is transferred between two sides of a structure. This k value is inversely proportional to the heat resistance of a structure, also known as the R value. In heat transmission through piping, heat resistance is R, in $(m^2.K)/H$, of a layer L (in m) and with a thermal conduction λ (lambda) in $H/(m.K)$:

$$R = \frac{L}{\lambda}$$

The heat insulation resistance value of Thermatras® insulation blankets was determined by Forschungsinstitut für Wärmeschutz e.V. in Munich. The λ value for insulation blankets equals approx. 0.054 $H/(m.K)$. Heat resistance therefore equals: $0.045 / 0.054 = 0.833 (m^2.K)/H$

Thermatras® cost-benefit analysis (Costings and estimates)

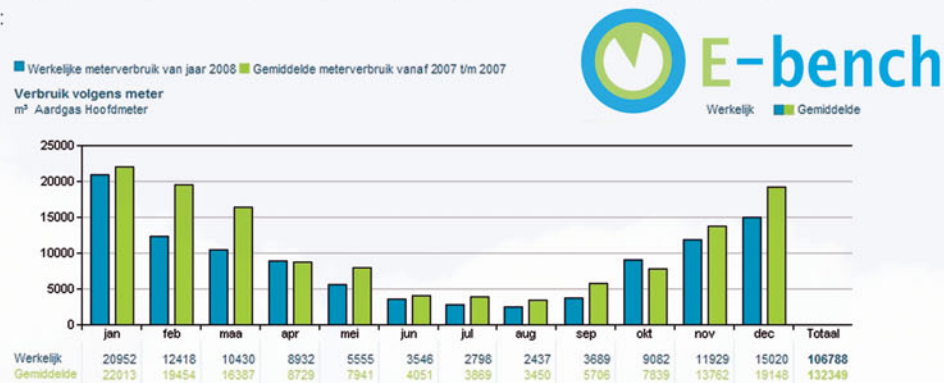
There are no good reasons not to insulate valves and ancillaries. Yet even when cost recovery can be achieved in a year, it is evident that in practise in industrial environments it is not common practise to have this kind of insulation. Maintenance budgets are closely scrutinised and are often significantly reduced. Only on the basis of specific cost-benefit analyses is it possible to set up a separate budget for this kind of energy saving activity. Thermatras® is experienced in carrying out this kind of analysis.

Energy savings using Thermatras® insulation blankets

E-Bench energy monitoring

E-Bench energy monitoring calculated energy usage for one of Thermatras' clients. Measurements were carried out both prior to insulating the ancillaries and after insulation had taken place. The conclusion was that insulation blankets can achieve a savings of 7%. This equates to a cost savings of €5,000.00 annually, leading to a cost recovery of the investment within two years.

Below is a graph clearly illustrating energy savings using insulation blankets (blue) as opposed no insulation (green):



Calculations indicating heat loss

The VDI-Wärmeatlas is an oft-used reference word for heat loss calculations. The general rule of thumb is that heat loss on non-insulated pipes varies between 50 to 70% depending on the diameter of the pipe. Heat loss through exposed seals is between two to three times that of a non-insulated flange. This is the same as 1.5 to 2m of bare piping.

Insulation can reduce energy loss considerably. Heat loss reduction through insulated versus exposed pipes can be as much as 90 to 95%. For ancillaries, this yield is between 80 to 85% (from: Het Ketelhuis – productie en gebruik van stoom in de praktijk* – Author N.D. Duinkerken.)

Interior pipes:

A non-insulated DN 150 interior steam pipe loses 1.6 kW of heat per metre by a temperature difference (Delta T) of 200°C. This loss is the equivalent of approx. 1,617 m³ (n) of gas annually.

A DN150 valve in that system will lose 2 x 1.6 kW = 3.2 kW of heat.

For a generation yield of 90% over a period of 8,000 production hours, this valve will lose the equivalent of 3,250 m³ (n) of gas annually. (8.000 hrs x 3,2 kW x 3,6 factor / 31,65 MJ / 0,9 boiler yield). The CO₂ emission of 3,250 m³(n) of gas is equal to 5.752 kgs.

The savings is €650 if gas costs 0.20 €/m³.

Costs savings using insulation with an effective yield of 0.8 x €650 = €520.

Insulations costs about €240. Cost recovery is achieved within six months.

Exterior pipes:

A non-insulated DN 150 exterior steam pipe loses 4.5 kW of heat per metre by a temperature difference (Delta T) of 200°C. This loss is the equivalent of approx. 4,549 m³ (n) of gas annually.

A DN150 valve in that system will lose 2 x 4.5 kW = 9 kW of heat.

For a generation yield of 90% over a period of 8,000 production hours, this valve will lose the equivalent of 9,100 m³ (n) of gas annually. (8.000 hrs x 9 kW x 3,6 factor / 31,65 MJ / 0,9 boiler yield). The CO₂ emission of 9,100 m³(n) of gas is equal to 16,107 kgs.

The savings is €1,820 if gas costs 0.20 €/m³.

Costs savings using insulation with an effective yield of 0.8 x €650 = €1,450.

Insulations costs about €240. Cost recovery is achieved within 2 months!

Cost savings using Thermatras® insulation blankets

New building costs

Despite the importance of insulation, it is normally at the bottom of the list when it comes to the budget priorities of new building projects. Insulation activities take place during the most hectic part of the construction process: between installing plants and machinery and production start up of the factory.

By way of illustration: in the petrochemical industry, the budget for "insulation" will equate to 3 to 5% of the total project costs. In the maintenance budget of these plants, costs can rise to between 5 to 8 %. At present, the tendency is to minimise insulation activities in an effort to keep costs down. This, however, is a short-term solution. Not only do repairs to insulation accumulate progressively, the energy loss that occurs as a direct result can reach enormous proportions.

The old principle "No insulation is better than bad insulation", from the days when energy costs were relatively light, is outdated in the sense that no insulation is not a realistic option from the point of view of energy and the environment. Bad insulation is not an acceptable solution either, neither from the point of view of an energy usage nor maintenance. Incorrectly applied or badly maintained insulation can result in huge costs in terms of maintenance, leakage, equipment replacement and even interruptions to production.

Maintenance costs

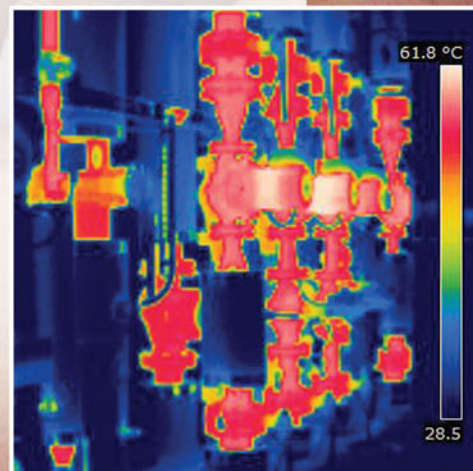
For the purposes of operations or maintenance, it is necessary in some cases that insulation can be removed from certain parts of the machinery on a regular basis. This can be done using removable shields around valves and flanges for example. But in some cases, such as for turbines, pumps, manhole covers, instrumentation etc, it is worth considering insulation blankets. The advantage is that the blankets can be made-to-measure, so that the blanket takes on the shape of the object as far as possible. It therefore provides optimum insulation that is easy to remove and replace, as often as required. Insulation blankets are a perfect example of an investment that may be higher initially but will reap rewards in terms of significantly lower maintenance costs.

Reliability of heating plants

Our experience in the field has taught us that the available space for heating equipment is becoming more and more limited. This is due in part to factors such as building costs. A consequence of this is that, despite regulations, ventilation is often inadequate. Heat in engine rooms is principally generated by heat retention in pipes and ancillaries, by far the most important heat source.

High temperatures in engine rooms are bad for the lifespan of electronic equipment in switching boxes. This leads to equipment failure and jeopardises the reliability of plants and equipment. Insulating ancillaries with

Thermatras® insulation blankets is a first step which can always be followed by installing ventilators.



Cost savings using Thermatras® insulation blankets

Personnel costs

Absenteeism due to ill-health of one member of staff equates to between one and a half to two and a half times their salary. This amount is made up of loss of revenue and replacement or extra workload on colleagues. If the sick employee is not reintegrated into the organisation, this may lead to increases in disability premiums for all employees (in large organisations).

Good health and safety policies lead to better working environments. A healthy work climate has a positive influence on reduction in disability and absenteeism due to sickness. This contributes directly and indirectly to increases in returns. Risk Inventories and Evaluation and Plans of Action (PoA) are important instruments for charting operating risks and finding solutions for them.

If the ambient temperature rises above 40°C there is inevitably a risk to health and appropriate measures must be taken. Apart from threats to health, high temperatures can also constitute a fire hazard.

The Law

Under the Environment Protection Act, heating plants are regulated in terms of their burning methods, safety and energy conservation. Most companies fall under this law that dictates that companies must limit their impact on the environment, which includes efficient use of energy. The Environmental Inspection Agency monitor companies to ensure that they comply with regulations. The measures that companies are required to take depend on their annual energy consumption. The agency determines whether energy saving measures can be taken, in which case the agency can require you to carry out an energy assessment. A Plan of Action for measures to be taken has to be drafted. The investment for carrying out these measures should be recovered within five years. If a company is in violation of the environment regulations, the Environmental Inspection Agency can apply sanctions, such as a fine or administrative enforcement. The agency may also revoke the company's environmental license.

European guidelines and regulations

In the future, the European Union is likely to become more stringent in terms of environmental regulations: *Proposed by the European Commission, the new energy policy for Europe aims, through a comprehensive package of measures, to achieve a series of ambitious targets on greenhouse gas emissions and renewable energy, as well as to create a true internal market for energy and to strengthen effective regulation.*

Environment costs

Environmental costs and damage to the environment are difficult terms to express in figures with any accuracy. Often short-term effects are emphasised and damage to the environment only manifests itself in the long term. The value of nature and the environment is difficult to make concrete and, because of this, it is often underestimated. In the future, growing importance will be attached to the principle "The polluter must pay".

Being environmentally conscious and having a neutral effect on the climate is being rewarded by subsidies on a growing scale, while polluting the environment is being punished with ever greater sanctions.



Improving safety and health in the workplace

Safe and healthy working conditions: it cuts both ways

A safe and healthy workplace contributes significantly to a decrease in sick leave and disability among employees. This is not only good for the employees, it also benefits the bottom line.

The new Occupational Health and Safety Act came into effect in the Netherlands (Arbowet) in 2007. The act gives employees and employers more freedom and responsibility with regard to how they put into practice working conditions policies within the organisation or sector. The Labour Inspectorate sees to it that employers and employees comply with the law and ensure that it is properly applied.

Safety

Apart from being detrimental to the health of employees, high temperatures also constitute safety risks. When temperatures are high, concentration wanes, increasing the chances of accidents. This is particularly the case if concentration and attention to detail is important, as it is for machine operators and those in technical positions.

The danger of burning, through direct contact with the hot surfaces of machinery, equipment, pipes and ancillaries, is not uncommon. This is especially the case in production processes involving steam and thermal oils: minor but also serious burn injuries often occur.

Apart from ensuring that proper protective clothing is worn and that safety procedures are drawn up, many organisations pay little attention to the actual dangers that their staff are exposed to. Often employees will alert each other to the fact that a certain machine part is hot. But when this is overlooked, the consequences can be dire. Burning hazards are not visible because metal only changes colour at extreme temperatures, whereas direct contact with anything hotter than 50°C will result in burn injuries. Sometimes fencing is erected around these areas for the protection of personnel. This, however, is a solution that only reduces the risk, it does not address the cause.

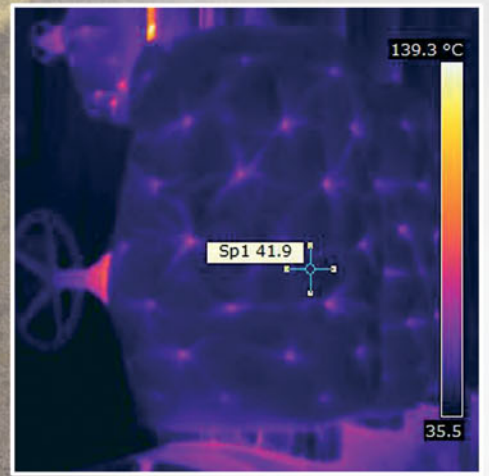
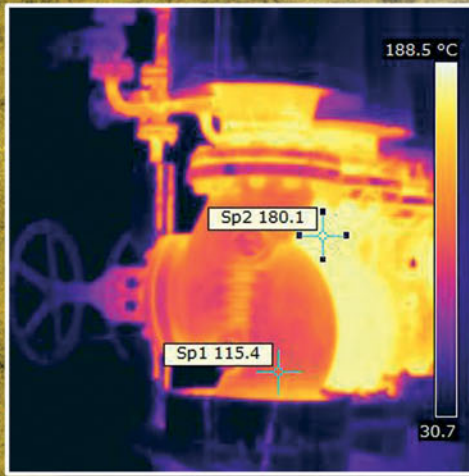
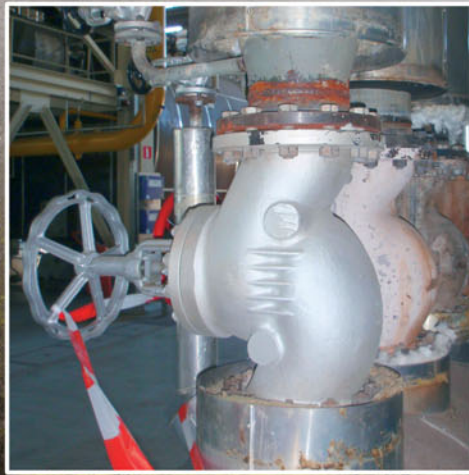
Using **Thermatras®** insulation blankets to cover hot machine parts can provide a solution to these hazardous situations.

Health

Working in high temperatures can be detrimental to health in a variety of ways. It can cause heat rash, cramps, heat exhaustion and in some cases heat stroke. Temperatures in excess of 40°C in the workplace invariably constitute health risks and physical discomfort. Appropriate measures should be taken to improve these unhealthy conditions.

In engine rooms containing machinery and equipment such as central heating installations, hot water, steam, condensation, thermal oil etc, the ambient temperature can easily exceed 40°C. Insulating ancillaries, piping, heat exchangers, autoclaves and other machinery is a measure that can provide the desired result.





Insulation blankets reduce maintenance and increase flexibility

Early on in the proceedings, provision must be made for insulation and the space required for this. Drawings for pipe layouts, for example, should take into account the general rule that cladding around piping requires a space of between 50 to 75mm. The most suitable insulation will depend on the operating temperatures. There are three systems for the insulating of ancillaries. Each type of material has its own specific properties:

Prefabricated PU and EPP insulation

For certain kinds of valves, prefabricated and removable EPP boxes are available on the market. These prefabricated boxes are made from PU (polyurethane) and EPP (Expanded Poly Propylene). The idea is that for certain kinds of valves, it is possible to prefabricate standard insulation boxes. Because of maximum temperature resistance, this system is only suitable for central heating installations.

The latest central heating systems generally consist of various central heating groups (units). These units contain various types of ancillaries, three-way valves, pressure regulating valves, non-return valves and pumps, all with varying diameters and capacities. Depending on space, difficult to access piping, i.e. close to ancillaries, is either not insulated at all or only partially using standard piping insulation. In these cases, insulation caps may not be an option. Insulated caps for three-way valves, butterfly valves and pumps are seldom available. If there is a seal in the heating unit for which an insulation cap happens to be available, the pipe cladding and the insulation cap must fit together perfectly. Considering that the space around the seal is often restricted by conduits, brackets and adjacent ancillaries, saws often come in handy to cut everything to make it fit. The result is very badly fitting insulation caps and considerable heat loss. In practise, this system of prefabricated insulation caps is very rarely used. As a result ancillaries are often exposed in pre-insulated systems.

Aluminium sheet metal cladding boxes

This type of insulation has the advantage over PU boxes in that aluminium sheet metal cladding boxes can be made-to-measure so that in principle any kind of ancillary can be insulated in this way. Often clip fasteners are used so that the sheet metal cladding boxes can be removed. Despite this, the system has its limitations:

- Significant heat transmission through contact with pipes or brackets (especially in steam and thermal oil installations), raising the external temperature of the aluminium sheeting to unacceptable levels.
- Often not enough attention is paid to insulation so that the aluminium caps need to be padded.
- They are difficult to remove, especially if rivets were used during assembly.
- Often it is possible to come into contact with the fibre glass and mineral wool under the cap, which is unpleasant and can cause skin irritation
- They can be difficult to remove for non-specialist insulators, leaving ancillaries exposed.

Insulation blankets

As opposed to the above methods of insulation, insulation blankets have relatively few limitations:

- Insulation blankets are custom-made so the shape of every ancillary is catered for and, depending on the available space, the insulation thickness can be adjusted, making reassembly relatively straightforward.
- Ancillaries and parts such as boiler surfaces, manholes and heat exchangers can be insulated easily.
- Wear and tear is practically non-existent thanks to the combination of glass fabric and synthetic fabric.
- Glass is a poor conductor of heat meaning that the temperature on the outside of the insulation blanket generally takes on the ambient temperature but in the worst case it is never too hot to touch.
- Since the mineral wool content of the insulation is covered on both sides by fabric, you do not come into contact with it.
- It is the ideal insulation method for areas that are prone to temperature problems.
- Insulation blankets are maintenance friendly and can be removed and replaced by the client.



Why are ancillaries often not insulated?

Exposed ancillaries and piping

Although the quality of piping insulation found in factories is generally acceptable, there are often insulation deficiencies, such as:

- Insulation that is not replaced where repairs have been carried out.
- Pipes are left exposed because in this way they are supposed to function as heating for the room.
- Pipes and ancillaries are left exposed because insulating is considered to be time-consuming during repairs and maintenance activities.
- Companies underestimate how much heat is lost through exposed pipes and ancillaries.
- Machine parts are situated so close together making it almost impossible to insulate them properly.

Some arguments for leaving ancillaries exposed speak for themselves, others need explaining.

Exposed pipes and ancillaries function as heating

Exposed steam and hot water piping situated high in the building (boiler house) is unlikely to contribute to heating the room. Heat rises and stays under the ceiling, eventually dissipating through the roof.

Inconvenience caused during maintenance and repairs to leaks

It is true that removing and replacing insulation takes time and effort. But the inconvenience is far outweighed by the savings in cost due to heat loss. If made-to-measure insulation blankets are used, saving time cannot be used as a reason not to insulate. Moreover, how often do seals and valves need to be extended or flanges and pressure equipment need to be covered? Hardly ever if modern cladding for sealing is used correctly.

Underestimating energy loss and overestimating the costs

In terms of energy savings, experience has taught us that insulation is possibly the best investment there is. Cost recovery takes months rather than years. Although heat loss cannot be completely eliminated through insulation, it is nevertheless considerable. Insulating pipes reduces heat loss by between 90 and 95% compared to exposed pipes. For ancillaries, the difference is between 80 and 85%.

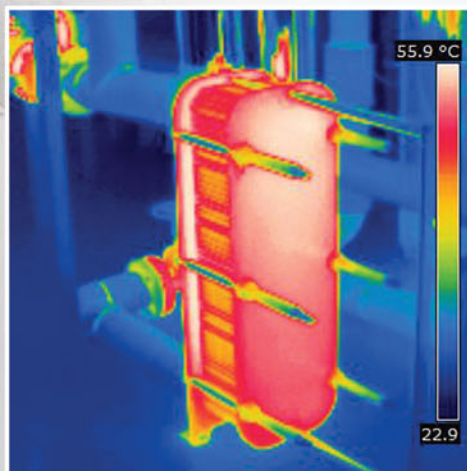
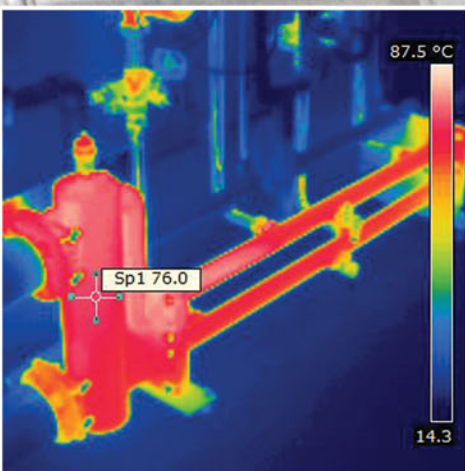
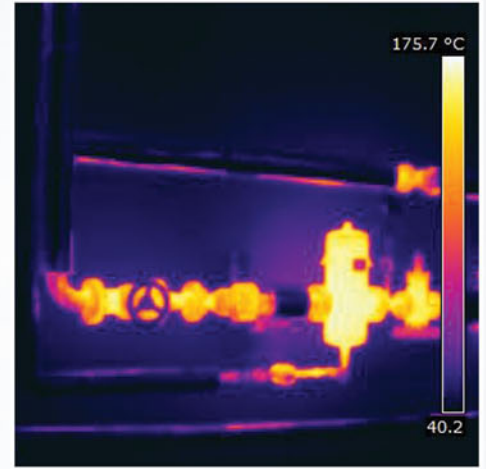
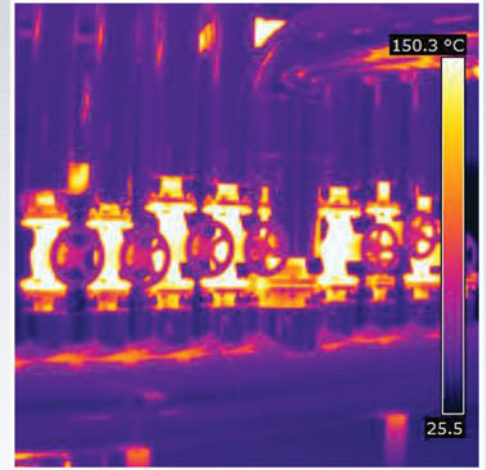
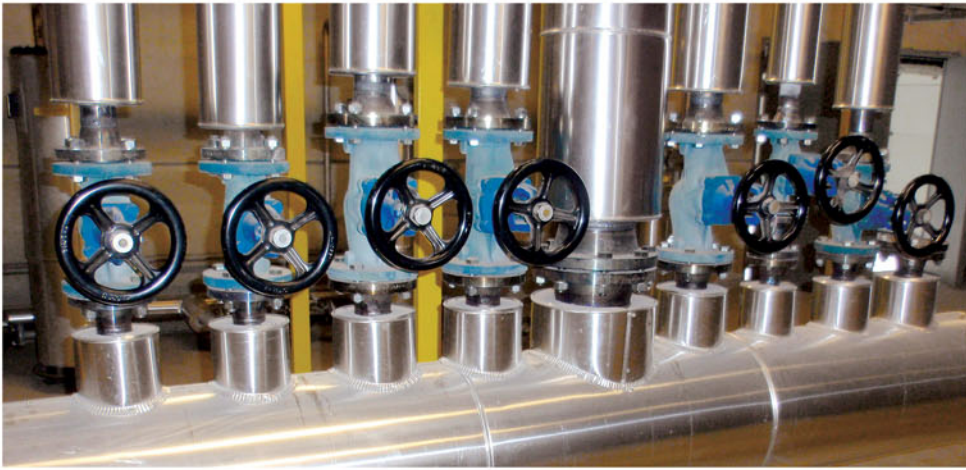
Supplied without insulation

In the past when gas and fuel prices were relatively low, it was common practise to leave the costs of insulation out of the budget in order to get the project approved. These days, in a climate of cut-throat competitiveness among installation suppliers, it still happens all too often. The argument used both then and now is "We'll get round to it later and put it down to maintenance". Later often becomes never! With the current price of fuel, and the cost of insulation as it stands today, it will quickly become apparent how costly this practice can be in terms of heat loss.

There are several reasons why ancillaries are often left without insulation:

- Underestimating energy loss leading to insulation of ancillaries being ignored.
- Lack of expertise regarding ancillary insulation among consultants and installers.
- Insufficient financial means and no budget set aside for insulation.
- Other priorities and options in terms of energy savings.
- Lack of expertise required to demonstrate unequivocally energy loss through ancillaries, based on well-substantiated cost-benefit analyses.

Cutting corners with insulation is definitely the wrong way to save money. Cost recovery using **Thermatras®** ancillary insulation in heating installations varies from two to four years.





Δ Therm

The new perspective on insula

A large, jagged iceberg floats in the ocean under a clear blue sky. The iceberg's surface is textured with various ridges and grooves, and its base is partially submerged in the dark blue water. The overall scene is serene and emphasizes the theme of environmental conservation.

matras®

tion ~ Saving the environment

Environmentally conscious practises as a business goals

Sustainable business practices and social responsibility

Thermatras® champions broad social responsibility and awareness of energy use in the business sector. Sustainable business practises must go further than mere marketing-speak, they must be applied in the broadest possible sense within business practice. Environmentally aware business operations offer a concrete framework for responsible business practice in the long term while contributing to broader awareness of the environment with business partners in the short term.

Climate change comes about through an increase in the average temperature on earth, which in turn is sparked by an increase in the concentration of greenhouse gasses in the atmosphere. The weather, and rising sea levels, affect humans and animals. The average temperature on the earth's surface rose by 0.6°C during the course of the 20th century. This may not seem like much, but the consequences are evident. Three years in the recent past (1997, 1998 and 2003) have been the warmest on record since 1860 – and probably the warmest in the last thousand years. The sea level has risen between ten and twenty centimetres. More rain is falling on areas around the equator. These changes are to some extent man-made; temperatures will continue to rise.

Greenhouse gasses such as carbon dioxide (CO₂) and methane (CH₄) are crucial for life on earth. Without this combination of gasses in the atmosphere, the temperature would be an average of -18°C. The average temperature on the planet at present is about 12°C. But the concentrations of greenhouse gasses (especially CO₂) has risen by 30% since the industrial revolution of two hundred years ago. The accelerated greenhouse effect as a result of this brings climate change in its wake, which is detrimental to life on earth.

If you want to help prevent climate change, saving energy is the most effective way. Being conscientious in your use of electricity, fuel and gas reduces greenhouse gas emission. This contributes directly to solving global climate change problems.

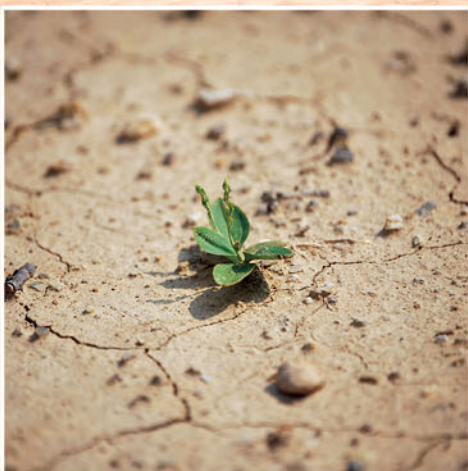
Long-term agreements on energy efficiency / Energy Efficiency Benchmarking Covenant

After the energy crises of 1973 and 1979, the governments of the industrialised nations launched several programmes aimed at reducing energy consumption. Energy users introduced important improvements to energy efficiency back then.

New impetus has been given to the issue through the effects of climate change. Energy use is linked to fuels that often contain carbon dioxide, the principle greenhouse gas. In reaction to increasing concerns about global warming, the United Nations signed a "Framework Convention on Climate Change" in 1992 that was ratified by 186 countries. It was later developed further by the Parties of the Convention, the Kyoto Convention of 1997 being the best known. In the Kyoto Protocol, quantitative commitments were laid down for reductions in greenhouse gas emissions. The EU targets were distributed among the member countries in 1998.

Governments use various means to arrive at greenhouse gas emissions. Besides energy levies and legal measures, the Long-term Agreements on Energy Efficiency (LTAs) in the Netherlands and the Energy Efficiency Benchmarking Covenant in Belgium are also used. Each member state has a similar concept that involves agreements between the government and businesses and institutions about more effective and efficient use of energy. This is not done on a voluntary basis, these are commitments that must be met and participants are eventually obliged to take energy saving measures.

The cost-benefit system used by **Thermatras®** makes it clear where energy saving options are to be found.



With what and where can insulation blankets be used?

Insulation blankets were originally used in the shipping industry. During the economic crisis in the shipping industry of the 1980's, many shipyards closed. In this period, Thermatras® was forced to penetrate other markets, such as the non-residential construction sector and industry in general and as such broadened their client base.

Insulation blankets are now used to conserve heat in engineering plants, such as gas turbines, steam turbines, exhaust systems, central heating installations, hot water, superheated water and steam installations, condensation, thermal oil, steam tracing and electrically traced installations. Insulation blankets are commonly used for ancillaries and equipment that require regular maintenance after insulation has taken place.

Valves

There are various kinds of valves such as globe valves, plunger valves, slide valves, diaphragm valves, ball valves, blow-off valve, bellow valves, float valves, blind flange valves, butterfly valves and non-return valves.

Ancillaries

By ancillaries we mean flanges, filters, sight glass, pressure reducing valves, pressure relief valves, steam traps, float condensation traps, condensation pumps, expansion joints, pumps, flow metres, manometers, mobreys, level gauges.

Other applications

Thermatras® insulation blankets can also be used to insulate parts of or entire machines and equipment such as water separators, air separators, waste separators, compensators, steam bottles, tube heat exchangers, plate heat exchangers, fronts and backs of boilers, manholes, economisers, flue gas condensers, silencers, exhaust pipes, turbo chargers, gas and steam turbines.

Below is an overview of the business sectors in which Thermatras® is currently active:

Shipping

Inland vessels, coasters, ocean going vessels, patrol vessels etc.

Light industry

Potato processing industry, cocoa industry, carbonated soft drinks industry, canned foods industry, vegetable and fruit processing industry, breweries, dairy industry, confectionary industry, meat processing industry, margarine, fats and oil industry, flour industry, etc.

Heavy industry

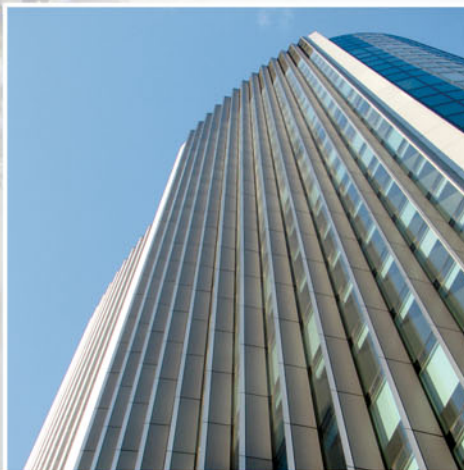
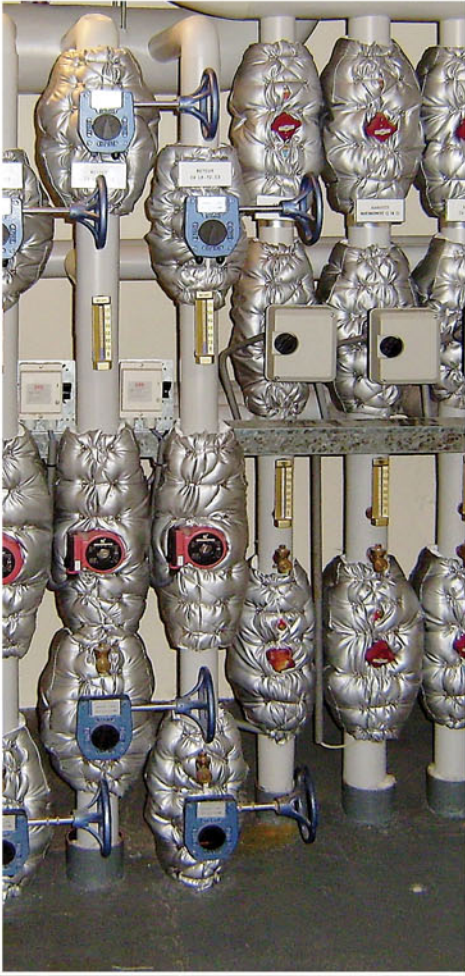
Nuclear power stations, conventional coal-fired power stations, biomass installations, combined heat and power plants, asphalt industry, calcium silicate and cellular concrete industry, metallurgical industry, rubber and synthetics materials industry, carpet industry, textile industry, storage and distribution companies, laundries, tank storage, surface treatment industry, pharmaceutical industry, animal feed industry, chemical industry, soap, laundry and cleaning agents, paint, varnish and printing ink, synthetic fabrics, fertilizer, synthetic scent and flavourings, power stations, incinerator installations.

Petrochemical industry

Land and offshore installations

Non-residential buildings sector

Banking sector, schools, universities and colleges, hospitals and university medical centres, psychiatric institutions and rehabilitation centres, nursing homes, accommodation blocks, office blocks, municipal buildings, swimming pools and recreation centres, and many other buildings with central heating and steam installations.



Insulation blankets used for central heating and HWH systems

Central Heating and hot water heating systems (HWH)

Central heating is a heating system which generates the heat centrally. The heat is brought to the various rooms in the building using a heat distribution medium (water or air).

Standard central heating systems generally comprise boilers, pipes and ancillaries to transport and regulate the heat to the various air handling units, radiators, convection tanks, heat exchangers and boilers. Primary sources for heat generation can also be municipal heating plants, steam or water heating plants, in which the central heating takes place in the secondary system of a heat exchanger.

Usually the pipes in central heating and hot water heating systems (sanitary hot water) are adequately insulated. In the majority of existing installations, hot water and air treatment systems, it is the ancillaries that are insufficiently insulated. Remarkably, insulation of ancillaries is also not standard on many new installations. Even hot water heating systems and high efficiency boilers do not always have effective insulation on various ancillaries. Investments are made in energy saving systems, but ultimately efficiency is not fully optimised.

Boiler rooms

Boiler rooms with heat problems are the rule rather than the exception. Often the reason for the problems can be found in insufficient insulation of ancillaries.

Increasingly in new building projects not enough space is set aside for machines and equipment. Often, the machinery only just fits into the small space allocated. If ventilation is also a problem then the ambient temperature can rise very quickly. Increased temperatures have negative consequences for the working environment of technical staff and for the lifespan of electronic equipment (switch boxes, pumps). Excessively high ambient temperatures can also contribute to the warming up of cold water systems, which in turn increases the risk of legionella bacteria infections.

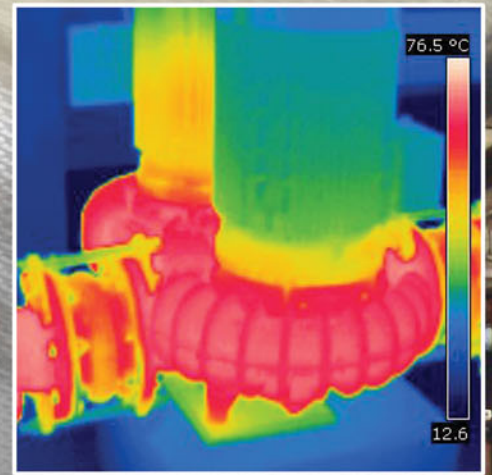
Of course, there are also large boiler rooms in which there is too much ventilation. In these areas, the heat generated by ancillaries is transported via the ventilation system directly to the outside air. This of course is a very efficient way to waste energy.

Thermatras® insulation blankets optimise effective energy production from the existing heating systems and reduce heat dissipation from exposed ancillaries. Insulation blankets are also perfect for small boiler rooms where other insulation methods cannot fit.

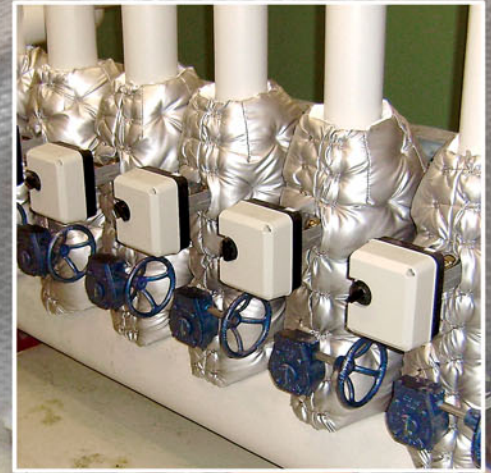


Examples of Thermatras® applications for central heating and HWH systems:





Examples of Thermatras® applications for central heating and HWH systems:



Insulation blankets for steam and superheated water systems

Steam

Steam installations are used in large building blocks and in industry. Steam is crucial to production processes in industry. Finally, the correct pressure, or correct temperature, must arrive at the place it is needed.

The steam path starts at the steam boiler (flame boiler or water pipe boiler), gas boiler, steam generator or steam converter and carries on through the steam distributor or steam reducer to the appropriate user, such as the heat exchanger, drier or other piece of equipment in the production process. Once the steam has emitted its heat, condensation accumulates in the steam trap, in other ancillaries and pipes which gathers in the condensation trap. From there, the condensation, together with fresh water (supplementary water), is directed via pumps to the degasser. To prevent corrosion, oxygen and carbon dioxide are partially removed here by spraying the water and heating it to 105°C. This heated condensation is then transported to the steam boiler to be used as feedwater.

Superheated water

Superheated water or hot water installations work by putting the water under pressure by heating it in the production process to temperatures of between 100°C and 180°C. Superheated water systems are very stable because overpressure is created, resulting in a rise in the boiling point. Hot water stays under pressure in the system, even after heat emission to the users, and therefore no condensation forms. The system is simple and efficient and resembles thermal oil installations in terms of its technical installation.

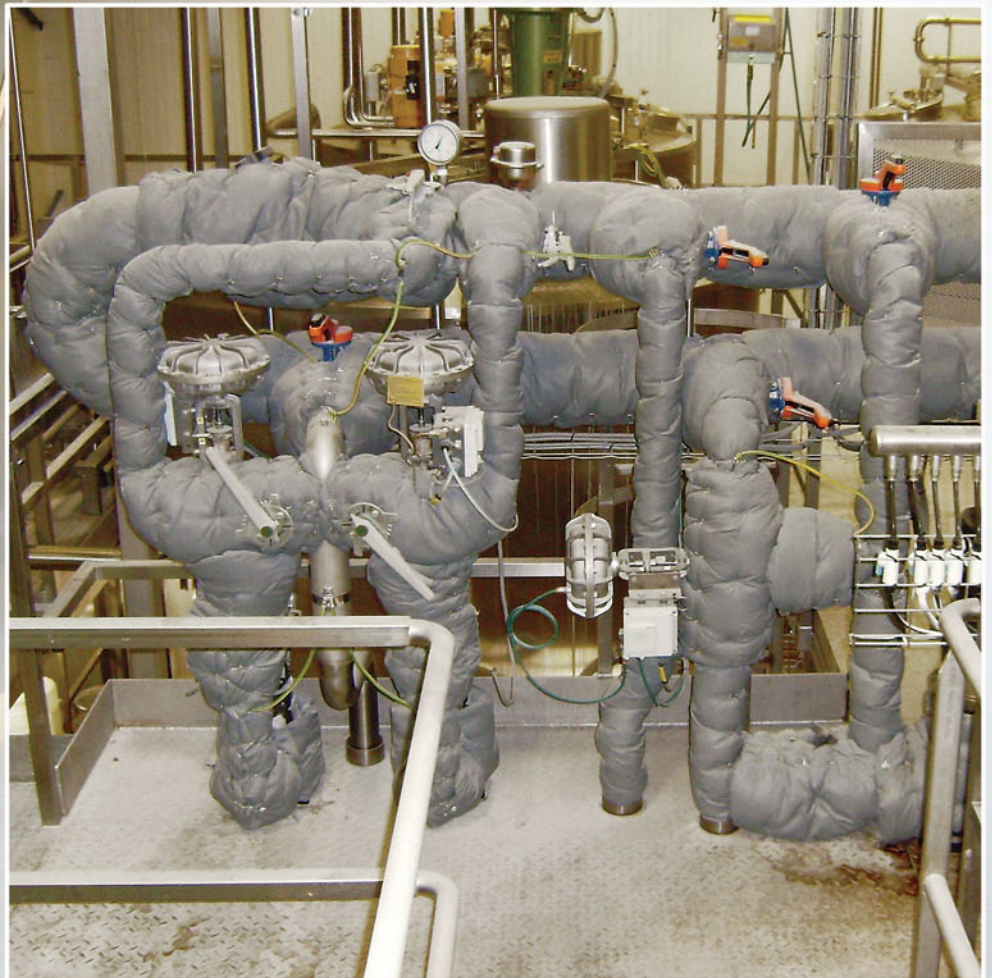
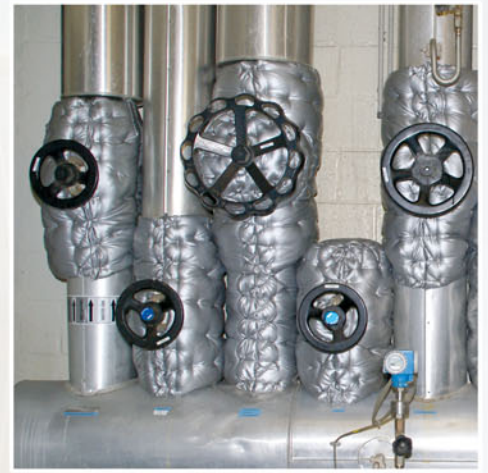
Examples of production processes using steam or superheated water:

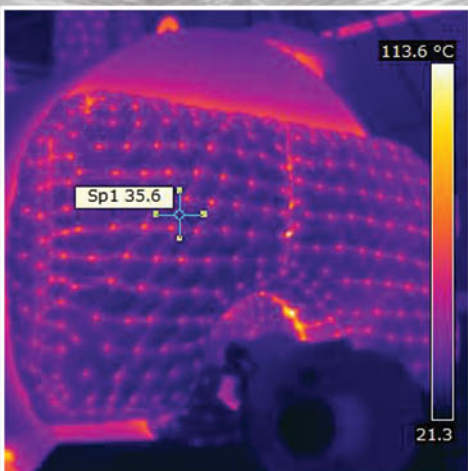
- pasteurising, preheating, sterilising, evaporating, dehydrating (dairy industry)
- boiling, pasteurising, bottle and barrel cleaning equipment (breweries)
- boiling, smoking, grilling, maturing, drying (meat processing industry)
- cleaning (CIP systems "cleaning in place") in all sectors of the food industry
- food pressers (mixed feed industry)
- dyeing, drying and pressing (textile industry, carpet industry)
- cellulose preparation, pressing, drying (paper industry)
- autoclaves (calcium silicate and canned foods industry)
- refineries, wet and dry melting (margarine, fats and oil industry)
- reactors (chemical industry)

In the steam and hot water installations mentioned above, ancillaries are often no longer insulated, badly insulated or not insulated at all. **Thermatras®** insulation blankets increase the efficiency of the installation and reduce the dissipation of heat through exposed ancillaries.



Examples of Thermatras® applications for steam and superheated water systems:





Examples of Thermatras® applications for steam and superheated water systems:



Insulation blankets applied to thermal oil installations

Thermal oil is oil used as a heating medium. This oil is ideal for heating to high temperature. Thermal oil is used in a closed circuit in temperatures to approx. 340°C. Thermal oil systems are not susceptible to explosion and are more efficient than steam.

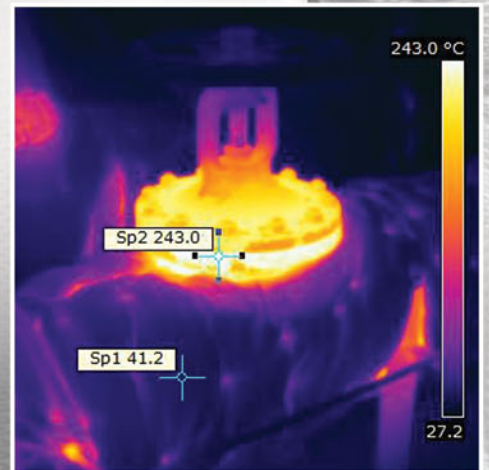
In thermal oil systems, there is often a huge difference between the system temperature and the ambient temperature. Insulating these installations is therefore very energy saving. **Thermatras®** has installed insulation blankets on many locations, increasing the energy efficiency enormously, much to the satisfaction of their clients.

Shipping

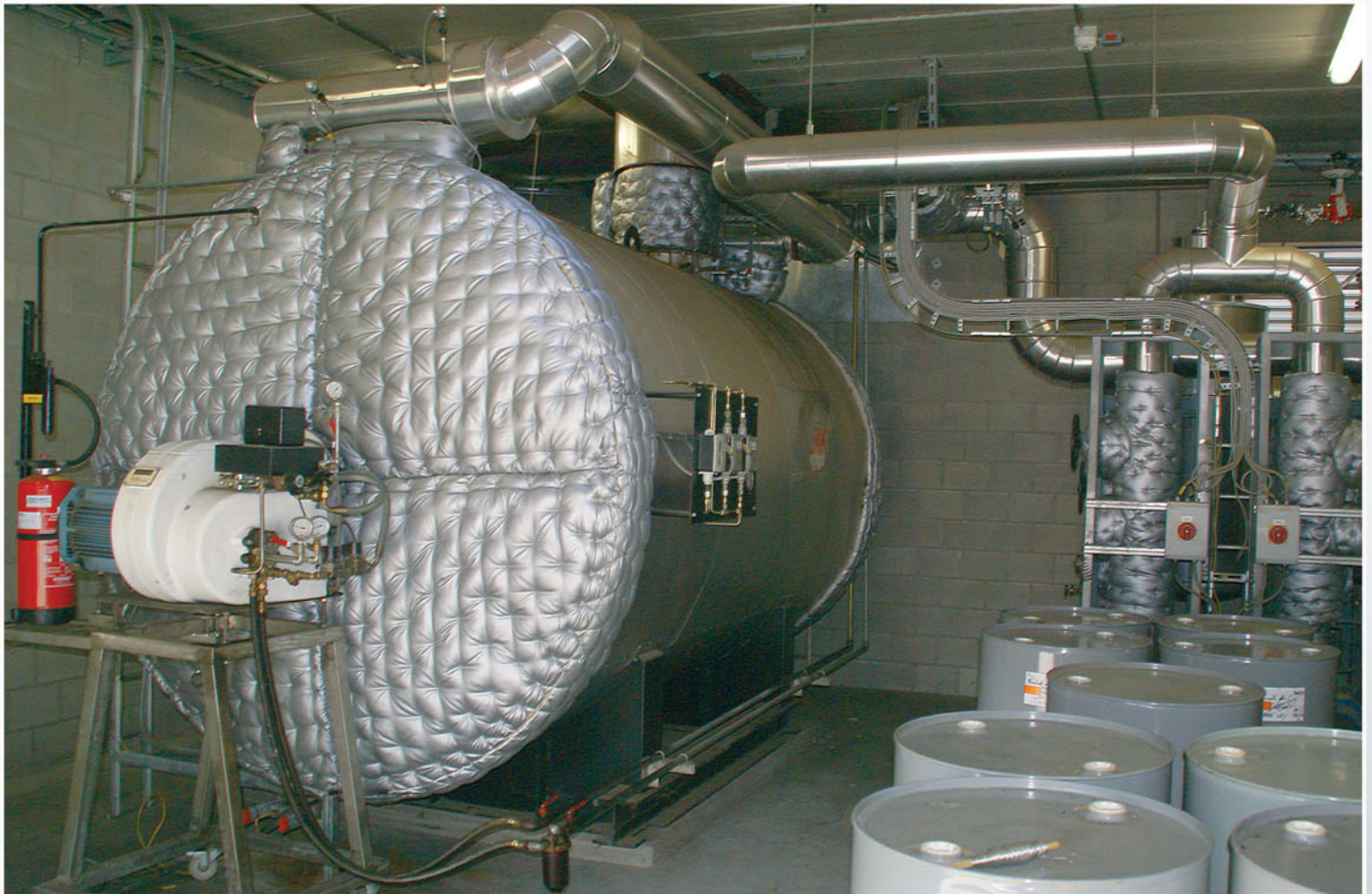
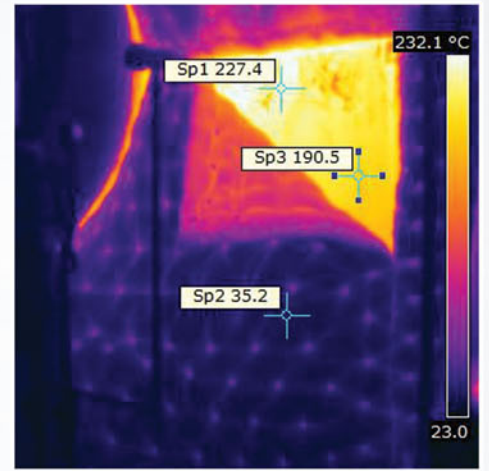
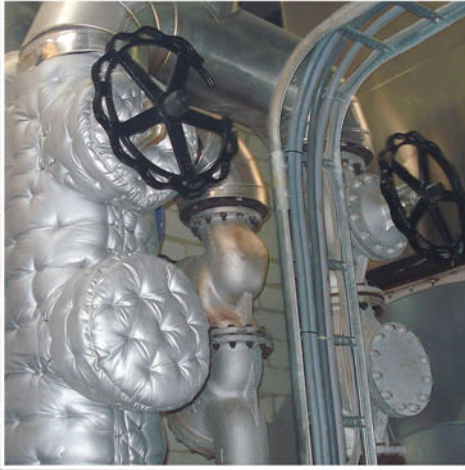
Thermal oil installations are particularly popular in the shipping industry to heat cargo and/or fuel. In the shipping industry, thermal oil is the preferred medium of engineers because it does not freeze at 0°C, as opposed to installations that use water.

Production process heating installations

Thermal oil is also popular in the potato processing industry (chips and crisps) and in the snack industry. Thermal oil is the primary medium for use in the heating of heat exchangers in which the secondary system consists of oil for the baking grease lines. The process heaters in the wood, bitumen, synthetic fibre, chemical and textile industries also use thermal oil installations.



Examples of Thermatras® applications for thermal oil systems:



Insulation blankets applied to generators and CHPs

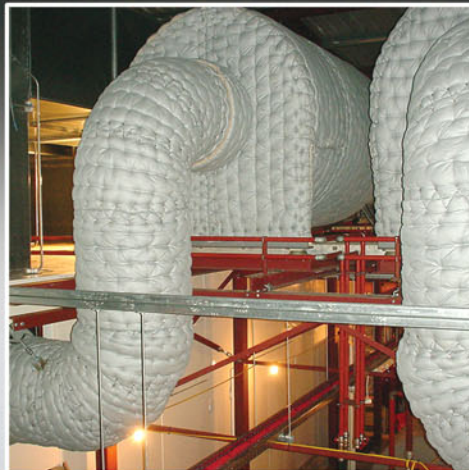
Thermatras® mounts insulation blankets on the exhaust pipes of hundreds of generators every year. A well-insulated exhaust pipe is essential to prevent fire and to reduce temperatures in the soundproof casings. This enhances the lifespan of electronic metres and regulators.

Apart from our work in the shipping industry, we are also active in the generators and Combined Heat and Power (CHP) installation sectors and the turbine industry. These markets are particularly interested in compact installations that offer the highest capacity. Available space is often very limited and insulating awkward parts is therefore often neglected. **Thermatras®** insulation blankets are very flexible and because they are take on the exact shape of the item to be insulated, they are ideal for small spaces.

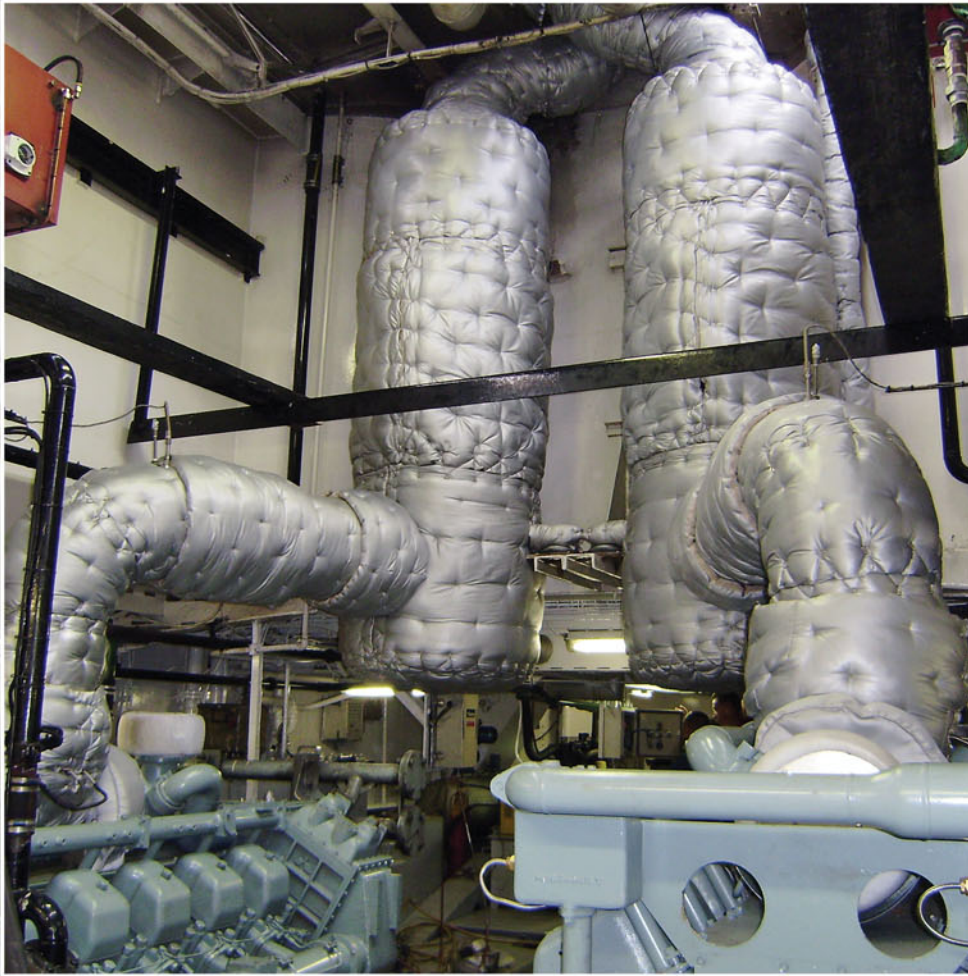
Thermatras' made-to-measure products also make it possible to simply and quickly access individual parts after the insulation has been fitted. From a maintenance and cost savings point of view, removable insulation is vitally important for maintenance and repairs. Fitting and removing insulation blankets is not restricted and can be done as often as necessary. One only has to unhook and refasten the stainless steel wire.

Do-it-yourself measuring and fitting made-to-measure insulation blankets

To save time and money, more and more companies are discovering that they can measure and fit **Thermatras®** insulation blankets themselves. This can be done by faxing or sending drawings of the system to be insulated, with the required measurements. Our offices will use these to draft individual production drawings. As soon as the next working day, it is possible that you may receive numbered insulation blankets accompanied by an installation sketch, delivered to your premises. Using the roll of stainless wire provided, virtually anyone could be capable of fitting the insulation blankets, regardless of whether they are trained technicians or not.



Examples of Thermatras® applications for aggregates and CHPs:





Examples of other Thermatras® applications:



Insulation blankets applied within the shipping sector

On board ships, it is the most normal thing in the world for all heated parts to be insulated. Safety and effective use of heat through proper insulation are fundamental. More and more frequently, shipping companies are using **Thermatras®** insulation blankets during their maintenance and repair activities and for new installations. This is done mainly from the point of view of cost savings.

Insulation must be easy to remove because, for minor repairs during the voyage, the engineer will have to fit, remove and replace the insulation himself. This is why insulation blankets are used for both ancillaries and piping. "Time is money" is a pertinent saying, particularly within the shipping sector. All kinds of machinery and equipment is found on board ships, including pipes for exhaust and effluent gasses, hot water, steam and condensation, and for thermal oil and traced insulations (steam and electric).

Thermatras' core activities are the measuring, producing and fitting of insulation blankets. However, Thermatras also has a department dedicated to conventional insulating of walls and decks in the accommodation quarters and engine rooms of ships using mineral wool insulation. In these cases, a combination of mineral wool with sheet metal cladding is used. Insulation blankets are applied for those items that need to be removable.

Safety in the shipping industry is fundamental. By taking precautionary measures, accidents can be prevented. Unfortunately, habit and routine lead to oversights.

The most important reasons for insulation in shipping are:

Protection against fire:

- Fire hazards in engine rooms through oil injectors coming into contact with hot exhaust pipes.
- Insulation regulations by order of the shipping inspectorate and insurance companies.

Improving the working conditions of crew:

- Preventing burn hazards through coming into contact with hot pipes and ancillaries.
- Reducing the ambient temperature.

Controlling the temperature of the cargo:

- When products in transport must not condensate, solidify or vaporise, insulation is of vital importance.
- Steam pressure and temperature are directly dependent on each other. If too much energy is lost, the requisite steam pressure level will not be attained and more stoking will be required. Insulation contributes directly to energy savings.

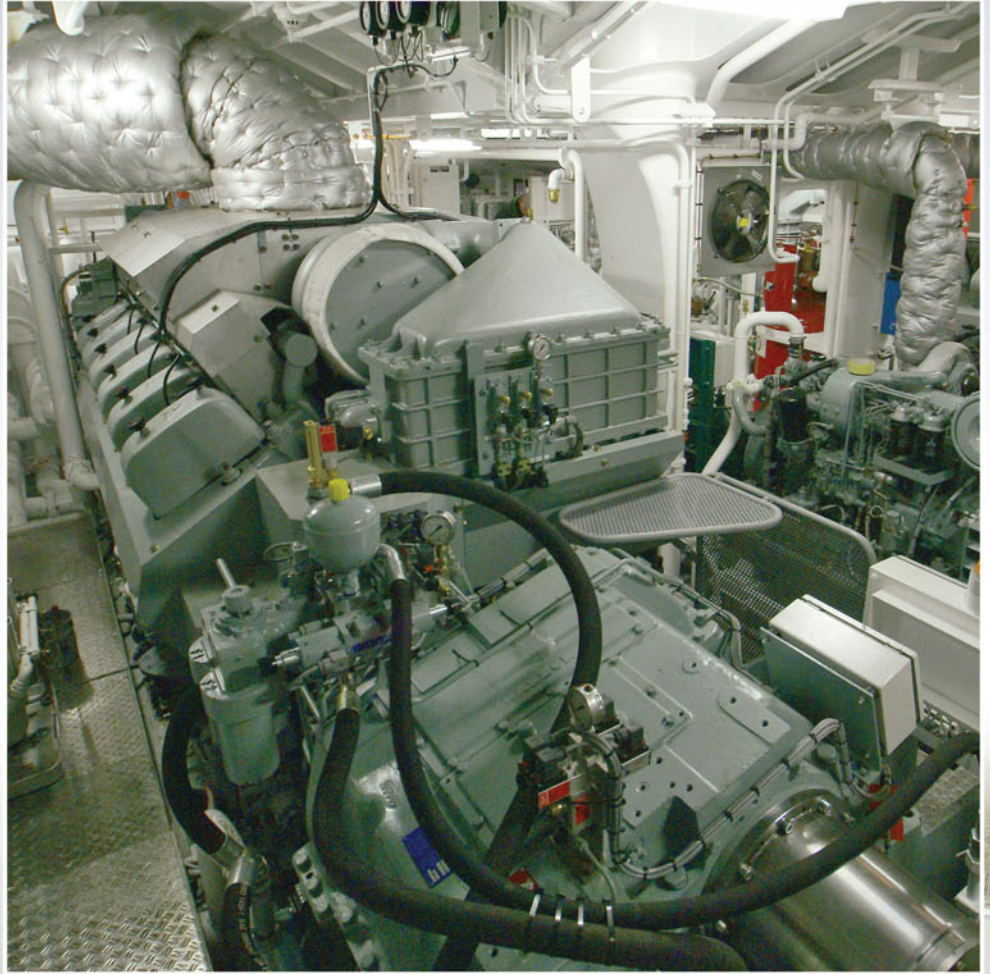
In the shipping industry, insulation must meet 3 requirements:

- It should be possible to insulate parts easily and quickly because stationary ships cost money
- Insulation must be removable and easy to refit so that crew can access the insulated parts for maintenance and repairs during the voyage.
- Insulation must be effective.

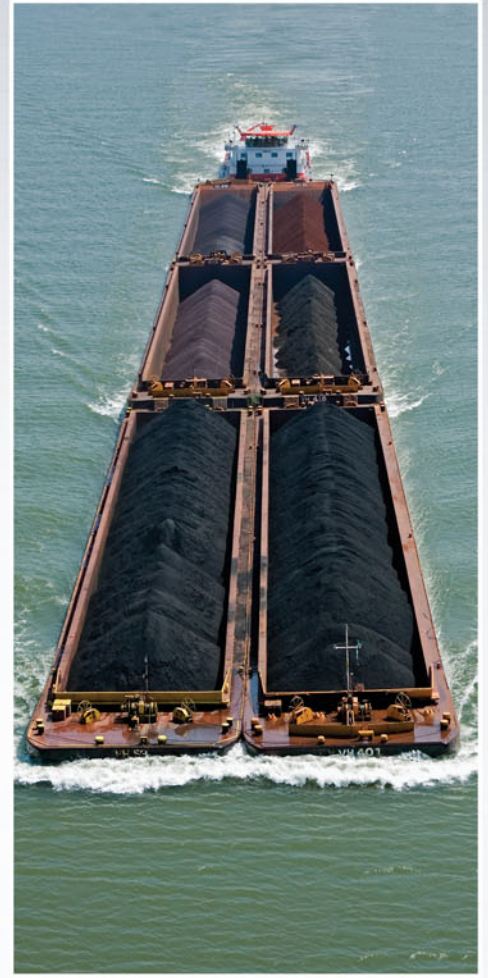


Examples of Thermatras® applications within the shipping sector:





Examples of Thermatras® applications within the shipping sector:



Thermatras® applied within the petrochemical industry

The use of **Thermatras®** insulation blankets has grown hugely in power stations, the petrochemical and chemical industries. The majority of insulation in the industry, especially for external uses, consists of mineral wool insulation finished with aluminium or stainless steel sheeting.

Thermatras® insulation blankets are water resistant

When the right materials are used, insulation blankets are water resistant. They are never 100% waterproof, as opposed to insulation with sheet metal cladding in which the joins are sealed with silicon kit. But, of course, sealing means that the sheet metal cladding are difficult to remove. Because of this, insulation blankets are being used more and more frequently for those parts for which the insulation needs to be removed and replaced. The cost of continually replaced sheeting cannot compete with the cost of insulation blankets.

Thermatras® offers solutions for various types of equipment and difficult to access parts that are almost impossible to insulate with traditional insulation. Made-to-measure insulation blankets are normally cheaper than insulation finished with sheeting. This is particularly the case when one takes into consideration the prefabrication and installation time needed for complicated sheeting projects.

Parts to be insulated specific to the petrochemical and offshore industry:

- Circulation pumps
- Steam, condensers, ancillaries.
- Ancillaries traced electronically or with steam
- Steam manifolds
- Man holes
- Drain valves

Tracing

Tracing is common in both industry and offshore. Tracing ensures that certain products, be they raw materials or end products, that pass through the system, are kept at or brought to a certain temperature. Tracing takes place either electronically or using steam.

Steam tracing

In steam tracing, the ancillaries are covered with copper pipes that are supplied separately by a main steam pipe. Good insulation is essential to maintain the specified temperature without the risk of losing heat. Insulation blankets can easily be made, with the necessary cut-aways and recesses, without restricting them in terms of ease of fitting and removal, properties that are essential for maintenance.

Electronic tracing

In electronic tracing, the ancillary is covered with heating cable. Heat is generated when current is passed through the cable. When fitting the insulation to ancillaries with electronic tracing, it is crucial that the heating cable is not damaged. There is a real danger during the fitting of insulation with sheet metal cladding that sharp edges may cut through the cable, rendering the tracing ineffective. Insulation blankets consist of glass fabric and they form a cushion for the tracing cable, making it impossible to damage the cable.

Examples of Thermatras® applications within the petrochemical industry:



Thermatras® applied within the greenhouse horticulture sector

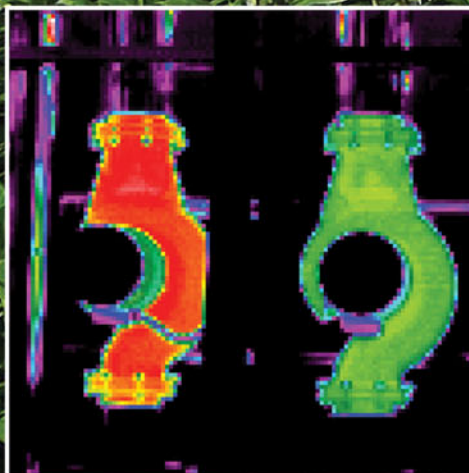
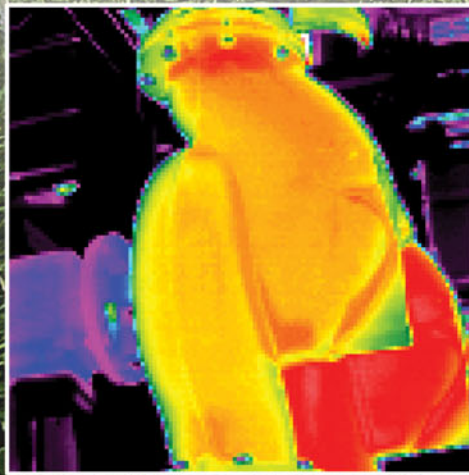
Greenhouses use various kinds of energy. Three quarters of all the energy used is generated with natural gas. About 10% of natural gas consumption in the Netherlands is used for horticulture.

The cost of natural gas in the greenhouse horticulture sector during the period 2004 to 2007 doubled from more than 400 to more than 800 million euro. The expectation is that this will rise to 1,275 million euro in 2010. At the same time, the government are demanding drastic savings in energy consumption. For the greenhouse horticulture sector, a resolution has been made between the sector and the government (GLaMi, a Long-term Agreement regarding the Environment for the Greenhouse sector).

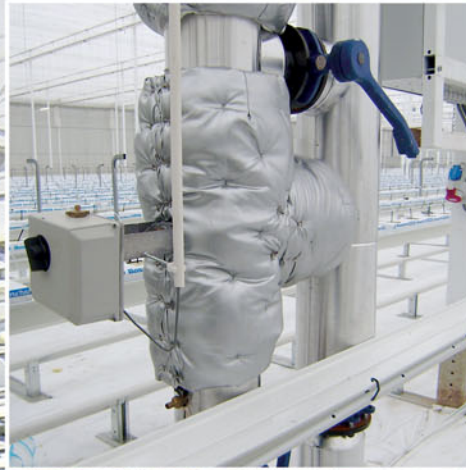
GLaMi energy targets for 2010 are:

Improvements in energy efficiency of 65% compared to 1980 and an increase in sustainable energy usage of 4%. These targets have been interpreted into individual company norms and have legal implications in terms of the Greenhouse Sector Resolution.

Thermatras® insulation blankets offer an excellent solution for reducing inefficient natural gas usage. By reducing heat loss, energy efficiency will improve and overheads for the heating of large greenhouses will come down. Short cost recovery times for insulation blankets in this sector are therefore achievable.



Examples of Thermatras® applications within the greenhouse horticulture sector:



Thermatras® applied in power stations and turbines

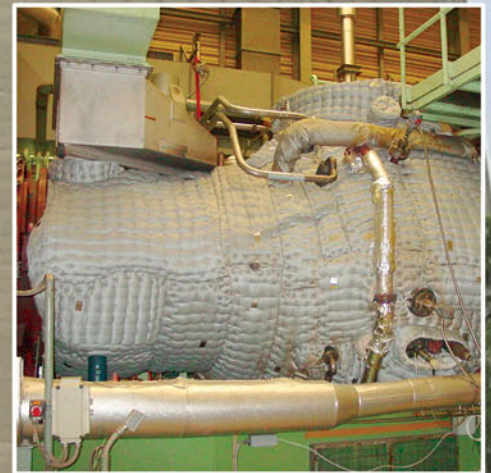
Power stations

When generating energy, it is vital that the highest possible efficiency is attained. However, significant heat loss often takes place through ineffective insulation of parts. **Thermatras®** has a proven track record with many power stations showing that energy losses can be considerably reduced.

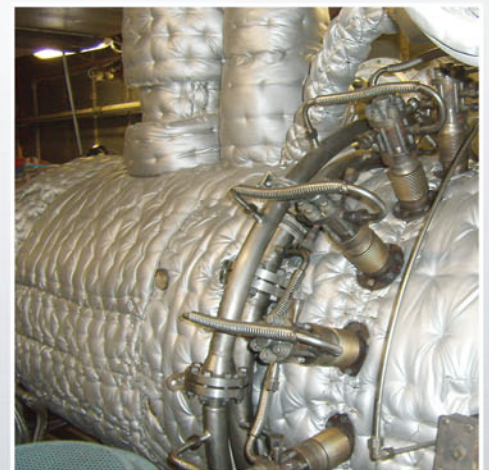
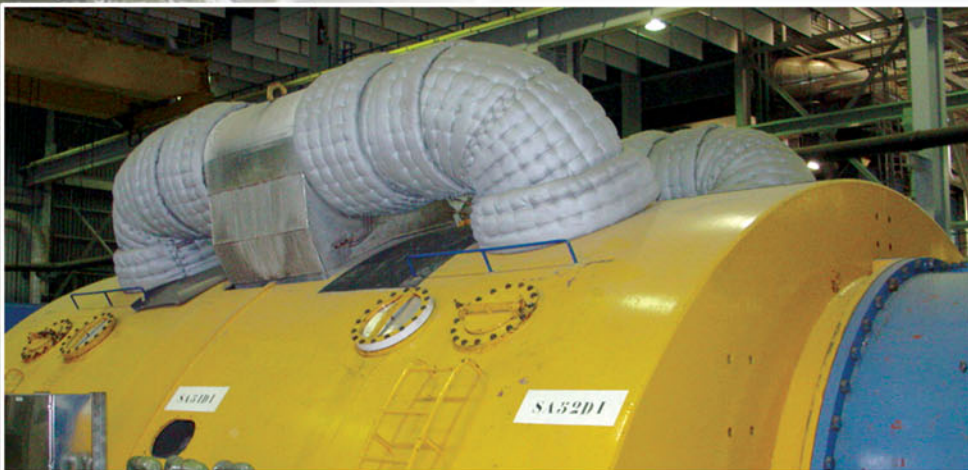
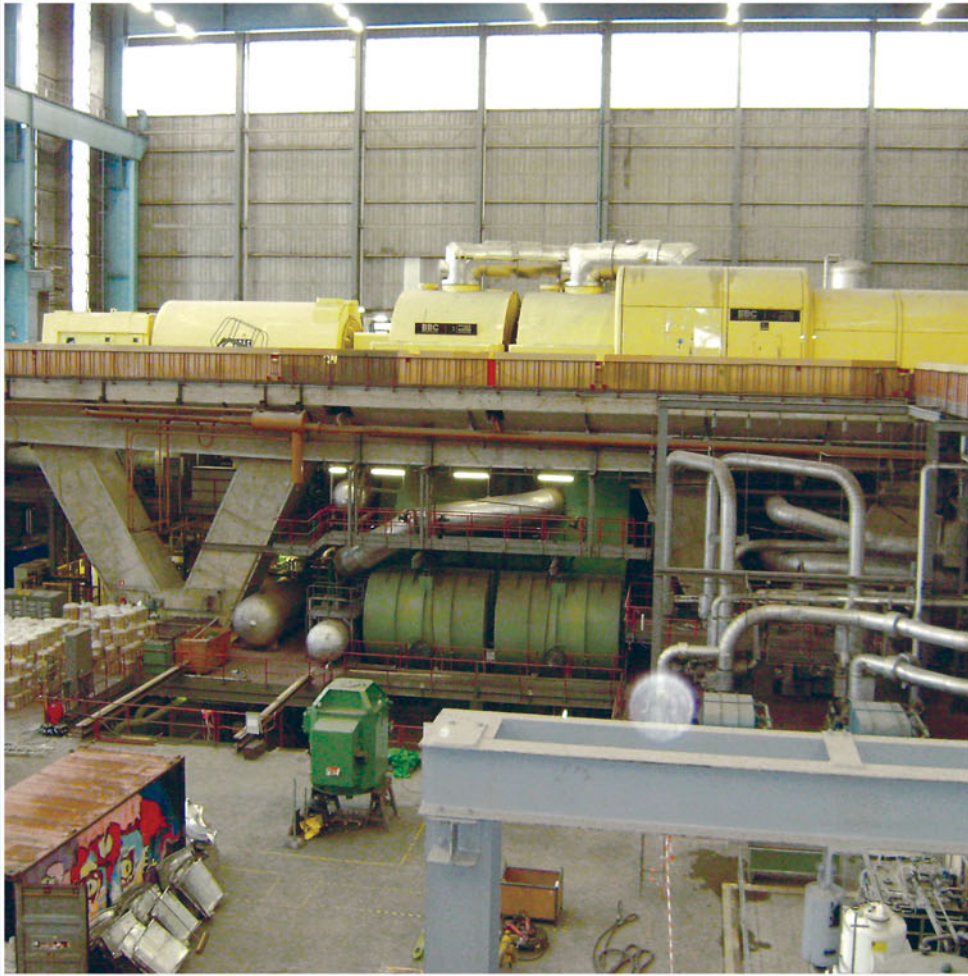
Steam and gas turbines

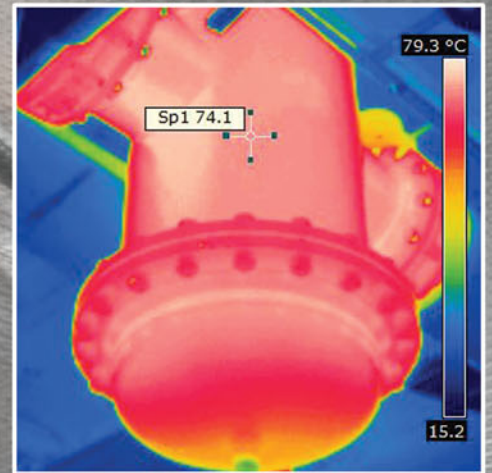
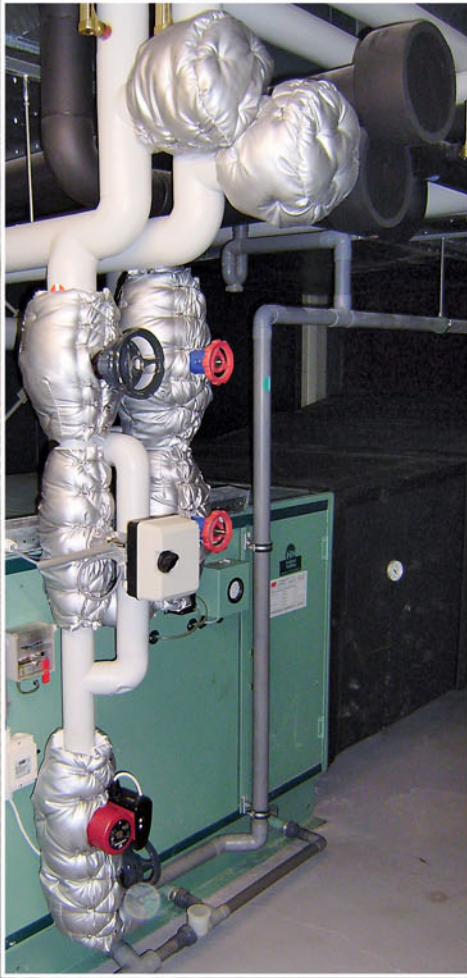
In industry, steam and gas turbines are normally an essential part of energy supply facilities. **Thermatras®** also has considerable experience in this sector, ranging from relatively small steam turbines to enormous gas turbines.

Because of the extremely high temperatures and the vast surfaces involved, it is not uncommon to apply more than one layer of insulation blankets in order to insulate the turbines effectively. Made-to-measure insulation is crucial in these circumstances.

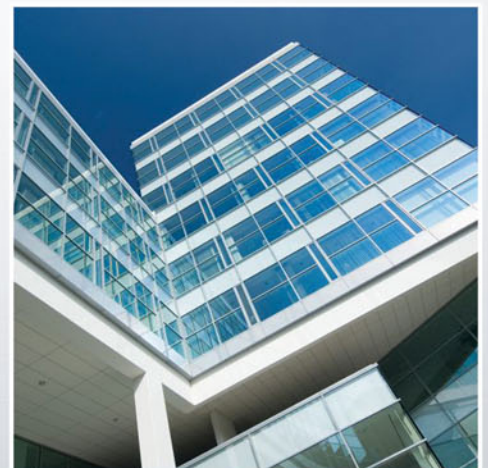
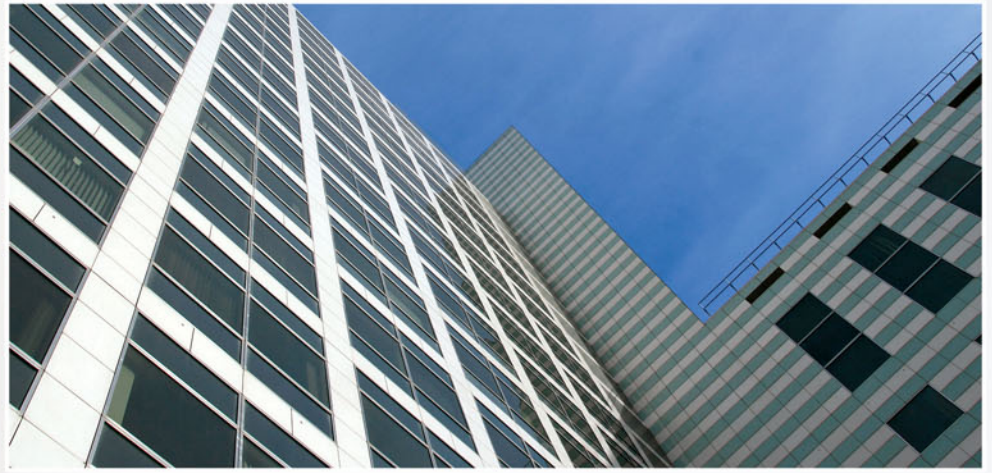


Examples of Thermatras® applications in power stations and turbines:





Examples of Thermatras® applications within the non-residential building sector:





AThermatras[®]

The new perspective on insulation - Saving the environment

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