ProRox®

Industrial Insulation

Discover how attractive your business can be.

ROCKWOOL®

TECHNICAL INSULATION

ROCKWOOL Technical Insulation

ROCKWOOL Technical Insulation, a subsidiary of the international ROCKWOOL Group, is a leading supplier of high quality stone wool insulation solutions for technical installations in the process industry and marine & offshore. With more than 75 years of experience the company has built a vast range of techniques and systems for providing thermal and fire safe insulation for the protection of technical equipment and facilities. Because of our strong focus on technical insulation, we can offer our high-end product lines, ProRox and SeaRox for all process, shipbuilding and offshore applications. Key applications include insulation for pipework, vessels, boilers, storage tanks, columns etc. in industrial plants, and insulation of fire-rated constructions, bulkhead and deck constructions, engine rooms, doors, panels and floating floors for the marine and offshore sector.

Focus on sustainability

With a strong focus on sustainability, ROCKWOOL Technical Insulation sets the standard in innovative solutions, high-quality service and a wide range of products with unrivalled thermal, fire, acoustic and sustainable performance. We provide cost-effective and energy efficient stone wool insulation solutions, protecting both the environment and your investment. Please visit our website www.rockwool-rti.com or call one of our local sales organisations (see also the respective ☎ on the back of this brochure).

Stone wool adds value

Stone wool improves the environment and the quality of life for millions of people. This versatile material is used to insulate against loss of heat and cold, it gives comfort and results in huge energy savings. By decreasing the need to burn fossil fuels, stone wool also reduces air pollution. Made of rock, stone wool is naturally fire-resistant and does not emit any toxic fumes in the event of fire. It tolerates temperatures of up to 1000°C and is used as vital fire protection in buildings, technical and industrial installations and for marine applications, to protect lives and valuable assets.

WWF's energy vision

- ROCKWOOL supports the WWF's energy vision: The global insulation company will be one of the key providers of green solutions to achieve the WWF vision.

Founding Partner of EIIF

- ROCKWOOL Technical Insulation was one of the founding partners of the European Industrial Insulation Foundation (EIIF), which has established itself as a resource for industries that need to reduce CO_2 emissions.

Preface

Global warming, climate change and environmental issues have become a major concern for countries, organizations and even individuals as we grapple with how to live, work and grow our businesses in a sustainable way. Companies can no longer ignore the urgent need to practice sustainable policies and strategies, ensuring businesses manage and protect their resources, be it water, materials or energy for the good of the environment and future generations.

Businesses need to become aware that investment in a sustainability policy delivers immediate environmental and financial returns, such as lower CO2 emissions and reduced energy consumption. ROCKWOOL Technical Insulation is taking the initiative to persuade industry of this truth, and to spur it to action. We know from experience that the technical insulation of installations such as pipework, boilers, columns and tanks always has a perceptible beneficial impact and pays for itself in the short run. In this brochure we give you a number of very valid reasons for taking your responsibility seriously. You'll see that it pays off.

Jeff Wilcox
Managing Director
ROCKWOOL South Asia

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Feeling the heat

The effects of climate change can already be seen in Europe and the rest of the world. It is almost certain that these adverse weather episodes will intensify in the coming decades. Temperatures are rising, rainfall patterns are shifting, glaciers are melting, sea levels are rising and extreme weather occurrences resulting in hazards such as floods and droughts are becoming more common. These changes pose a serious threat to human lives, to economic development and to the natural world on which much of our prosperity depends.

Feeling the heat

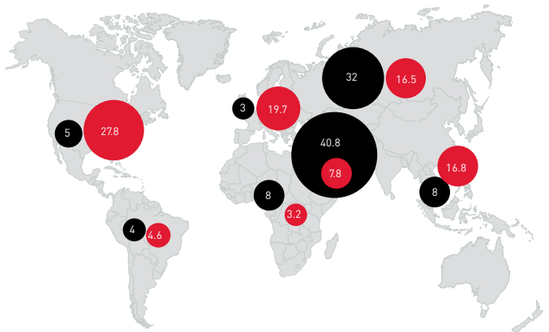
Rising energy demand

Despite climate change, one of the major sources of man-made global warming remains the combustion of fossil fuels – coal, oil and gas for power generation and heating. Over eighty percent of the energy currently being consumed is obtained from non-renewable resources. Energy resources are becoming increasingly scarce, while at the same time the demand for energy is soaring. Major economies like Japan, India, China, the US and the EU, all consume more energy than they can produce themselves. Within two decades EU energy imports will reach 490 billion euro per year, or some 1460 euro per head of population. Surely some of that money could be spent intelligently to reduce energy wastage.

Security of energy supply

Many of the major world economies are facing high dependence on natural gas imports. Most of the world's natural gas reserves are controlled by just three countries: Russia, Qatar and Iran. Security of energy supplies has become a key issue. This makes many societies vulnerable to disruptions in energy supplies. As recently as January 2009, during a period of very high gas demand in Western and Eastern Europe coinciding with the coldest weather in two decades, supplies of natural gas via Ukraine were shut off. In some countries, important societal and business activities came to a standstill.

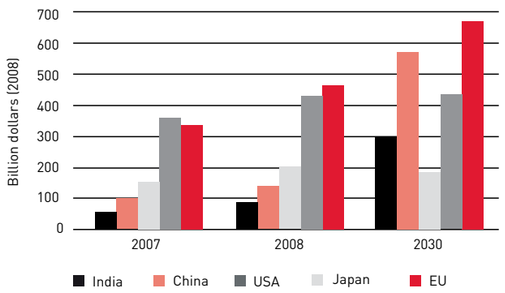
Who has the gas resources?



● % of worldwide gas consumption by region
● % of worldwide gas reserves by region

Sources: EIA 2009; BP 2009

Higher spending on oil and gas imports



The spending on oil and gas imports in the EU is expected to reach $671 billion in 2030 (in year-2008 dollars). This is more than today's GDP of Poland, the world's 18th largest economy, and represents some $2000 per EU citizen. India's & China's expenditure on oil and gas imports are expected to skyrocket.

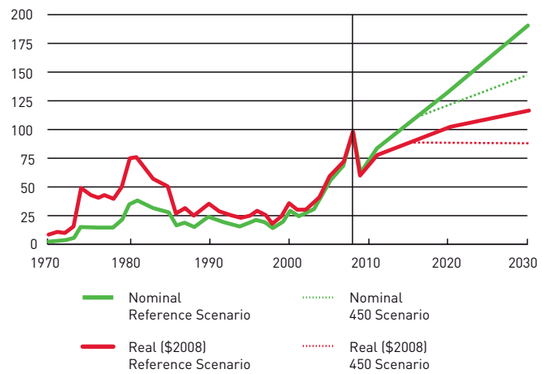
Source: World Energy Outlook 2009, OECD/IEA, page 124

Lower energy prices with CO_2 reductions

Using more insulation and other climate friendly technologies will have the additional benefit of reducing the growing demand and price of fossil fuels. With a CO_2 concentration of 450 ppm (parts per million) in the atmosphere, there may still be a chance to limit the growth in average temperature to 2°C.

Average IEA crude oil import price

Dollars per barrel



Source: World Energy Outlook 2009, © OECD/IEA, 2009

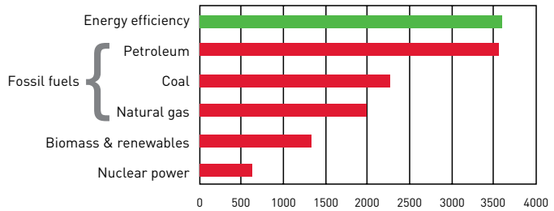
Feeling the heat

Combating climate change

For the EU, combating climate change is a top priority. Europe is working hard to cut its greenhouse gas emissions substantially while encouraging other nations and regions to do likewise. Europe has entered into a unilateral commitment to cut its emissions by at least 20% of 1990 levels by 2020. This commitment is being implemented through a package of binding legislation. Installations with a thermal consumption which exceeds 20MW must monitor and annually report their CO_2 emissions and are challenged to reduce their CO_2 emissions. The overall emission cap for each country was set in phase I and phase II of the EU Emission Trading Scheme (the EU ETS) up to 2012. In phase III, from 2013 to 2020, heavy-emitting industries covered under the EU ETS will have their emission allowances cut back each year. This means that emissions reach 21 percent below 2005 levels by the end of the period.

The sixth fuel

The role of different resources in the world energy balance (1999)



Energy efficiency is the largest source of energy.

Efficient energy use

Efficient energy use, often called energy efficiency, is the most important key to a low-carbon future. According to the International Energy Agency it can deliver 56% of the CO_2 reductions needed – that's more than the combined effect of a drastic increase in renewable energy, nuclear power and carbon capture and storage.

The International Energy Agency (IEA) warns:
"In the absence of new initiatives to tackle climate change, rising global fossil fuel use continues to drive up energy-related CO_2 emissions, from 29 Gt in 2007 to 40 Gt in 2030, an increase by 40%. Although the financial crisis has slowed the growth in emissions, current trends put us on a path to a global average temperature increase of up to 6°C. The projected rise in energy demand also has implications for ambient air quality, with serious public health and environmental effects, particularly in developing countries."

The solution: insulation

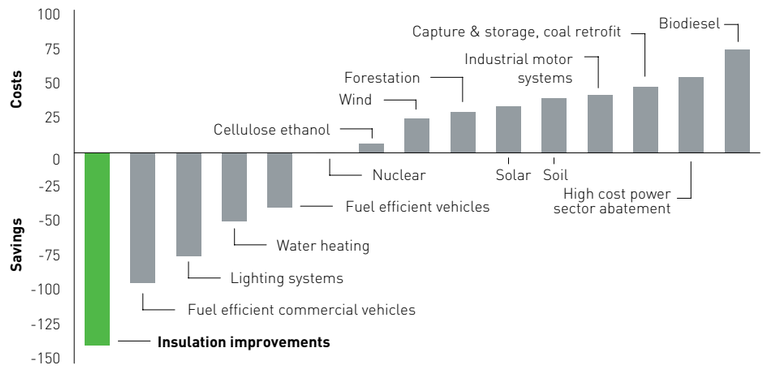
Energy efficiency is all about reducing the amount of energy required to provide products and services. It can be achieved by applying more efficient 'high tech' equipment for power generation and heat generation. But it can also be achieved by ensuring that the heat loss throughout the system is reduced to a minimum. The hidden potential of an existing solution like insulation is not yet fully recognized. However, insulation is highly profitable in energy and CO_2 savings. Redesigning and insulating pipes, ducts, boilers and hot process equipment contribute to a low-energy, low-carbon future. What is required is sustainable design and effective installation of the necessary insulation. This will ensure that the energy consumption of a processing plant is not only reduced significantly, but also saves operators **millions of euros** and reduces the impact on the environment.

The lowest hanging fruit

According to McKinsey/Vattenfall, better insulation is the most profitable way to save energy and reduce CO_2 emissions, it is the lowest hanging fruit. It can save 1.6 gigatonnes of CO_2 equivalents per year (the equivalent of Russia's entire CO_2 emissions), not with a net cost, but with an average economic gain of **130 euro** per tonne CO_2.

The lowest hanging fruit - insulation is the most profitable CO_2 saving - examples

€ / tonne CO_2 equivalents



Source: based on McKinsey/Vattenfall / Note: For the full, unsimplified version of the graph, see www.vattenfall.com

Insulation pays off

Industry accounts for 26% of annual energy consumption and almost 40% of total energy-related CO_2 emissions. Over recent decades, industrial energy efficiency has improved and CO_2 intensity declined in many sectors. But this progress has been offset by growing industrial production worldwide. Projections of future energy use and emissions show that without decisive action, these trends will continue. Energy prices will continue to rise.

Insulation pays off

The carbon challenge

From 2013, the revised European Trading Scheme (EU ETS) requires a reduction in CO_2 emissions of 21% in 2020 compared to the emissions verified in 2005. Energy in all its forms represents a major part of annual production costs. In the case of refineries this can be as high as 60%. Annual energy costs often make the difference between making a profit and losing money. Owners, designers and operators of large industrial plants are faced with the task of reducing their energy consumption as much as possible in order to ensure the long-term sustainability of their operations.

Saving energy and money

Industry has already made substantial investments to reduce energy consumption and emissions. But the hidden potential of an existing solution like insulation has not yet been fully exploited. When we look around an industrial plant, insulation can be seen everywhere. So it seems clear that insulation serves an important role in the operation of chemical, petrochemical and oil refining facilities.

Annual energy consumption (EU)

33%
of all energy is used for **transport**

41%
of all energy is used by **buildings**

26%
of all energy is used for **industry**

Insulation contributes to energy efficiency.

Value proposition of insulation

Insulation is commonly applied to protect staff from burn hazards and to retard the flow of energy into or out of a process, keeping temperatures within certain limits, allowing chemical reactions to proceed normally and manufacturing chemical and oil products safely. The value proposition of insulation, however, is not restricted to the medium inside or operation of the plant, it also reflects the energy invested to keep the medium at the optimum temperature.

The hidden potential

The footprint of an industrial plant is considerable. For example, a medium sized oil refinery contains 222 km of insulated piping and more than 26 football pitches (130,000 m²) of insulated equipment, vessels and tanks. The temperature inside can easily go up to 600°C or more. Insulation is therefore essential to keep the heat inside.

As a general rule of thumb approximately 80% of the heat can be kept inside if the insulation is properly designed and maintained. Investigations done by the Dutch NCTI[1] demonstrate that for many plants the saved heat ranges from 50% tot 60%. So there is still huge potential for at least 20% in energy savings.

Based on data from more than 700 industrial energy assessments, the US NIA[2] estimates that implementing a comprehensive insulation maintenance and upgrade programme would result in annual energy savings of **3.5 billion euro** and 43 million metric tonnes CO_2. Implementing such a programme would also create 89,000 jobs per year for both the insulation contractors and other related business channels.

[1] NCTI: Nederlands Centrum Technische Isolatie

[2] NIA: National Insulation Association

Energy savings of 3.5 billion euro per year represents:

- 45 billion kWh of electricity, enough to power 42 million households
- 82 million barrels of oil, enough to fill about 41 super tankers
- 19 million tonnes of coal, enough to fill 190,000 railway wagons

43 million metric tonnes of CO_2 reduction per year equates to:

- Adding 1.9 billion mature trees or 170,000 km² of new forest, an area the size of ¾ United Kingdom
- Removing 7.9 million cars from the roads
- Shutting down 11 coal-fired power plants, 16% of US installed coal-fired capacity

Too good to be true?

The effect of upgraded and properly maintained insulation is often so beneficial that people simply don't believe it. They don't believe that the potential savings are realistic because they are not immediately visible. Third party information and research from bodies such as the International Energy Agency (IEA), US Department of Energy (DOE), National Insulation Association (NIA), Dutch NCTI, the European Union (EU) and the European Industrial Insulation Foundation (EIIF) is widely available. The German VDI 4610 committee is in the process of preparing new guidelines to optimize the energy efficiency of industrial plants.

Focus on insulation

Keep in mind that properly designed and maintained insulation not only saves energy but also improves the operation of the plant. It's no news to many plant operators that during rainfall, steam generating capacity needs to be increased to meet the heating demands for the operation of the plant. This can easily go up by 25%. This is primarily caused by damaged insulation and the improper insulation of fixtures such as valves and flanges. Additionally, the insulation is often not designed to maintain heat losses over the plant to a minimum.

Inspect and repair

In many cases the insulation is not promptly and properly maintained, simply because it is not considered a risk or cost effective. Industry has been estimating for years that between 10 and 30 percent of all exposed insulation becomes damaged or lost within one to three years of installation. Over time, and depending on the operating environment and exposure to the elements, that percentage is likely to be higher.

The effect of damage, or the failure to reinstall insulation after maintenance of e.g. a valve, is substantial. In many cases the reduction in heat loss is up to 40% less than expected when the insulation is damaged. The costs of repairing the insulation are usually negligible compared to the annual savings.

Damaged cladding of insulation will not only result in increased heat losses but it often also enables water to penetrate into the insulation which can cause corrosion. Costs due to corrosion and additional, unexpected energy losses are substantial. The costs of inspection and repair are in all cases negligible compared with the potential savings.

Heat losses from damaged insulation can be up to 8 times greater

	Heat loss (W/m)	Reduction heat loss
Uninsulated pipe	6400	-
50 mm ROCKWOOL ProRox pipe sections	350	95%
Damaged insulation	2800	56%
Repairing the damaged insulation will save 260 euro/yr.m		

Design conditions: LP Steam pipe temperature 320°C, DN200 (Ø 8 inch), Ambient temperature 10°C, wind speed 5/ms, energy costs: 0.03 euro/kWh, ROCKWOOL insulation: ProRox PS 960

Source: National Insulation Association

Too good to be true?

Just a valve?

In terms of the total footprint of an industrial plant the apparent length of fittings such as valves and flanges is relatively small, so it looks as if insulation will not contribute to reducing heat losses. The heat losses incurred through uninsulated valves and flanges are substantial even at low temperatures. According to the German VDI guideline 2055, an uninsulated valve (DN100) located outside loses almost as much heat at 100°C as 36 metres of uninsulated piping. The temperature of the medium can also decrease to such an extent that critical process temperatures are not reached, at which point, for example, the medium will start to crystallise. Valves and flanges must therefore be insulated effectively. To avoid damage during inspection or repairs, the insulation of valves and flanges should be designed with removable coverings or hoods, to allow easy access.

	Mid-Size Chemical plant	Refinery (150.000 barrels per day)
Insulation damage	19.2%	21.3%
Corrosion	182,000 euro annually	365,000 euro annually
Additional energy loss (0.012euro/kWh)	1,335,036 euro annually	7,783,942 euro annually

Source: US steam digest, insulation management and its value to industry

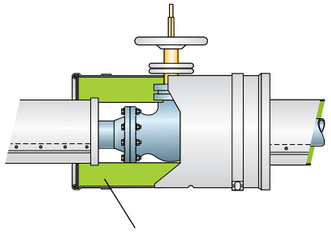
Potential gain of an insulated valve

- Steam pipe 220°C
- Pipe diameter DN150
- Located outside 20°C
- Average wind conditions
- Annual energy losses without insulation: 2895 euro
- Annual savings with insulation (80% efficiency): 2300 euro
- Insulation costs 200 euro
- Payback time < 2 months

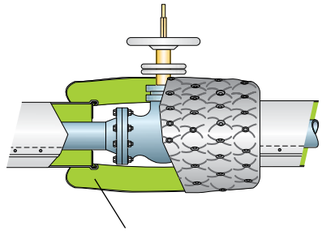
Uninsulated valve

Source: NCTI

Insulation of valves should be designed with removable coverings or hoods



ROCKWOOL ProRox insulation



ROCKWOOL ProRox insulation

Upgrading the insulation work

Reducing the energy consumption of an industrial plant is only possible if the insulation is upgraded in such a way that the heat losses are reduced to a minimum. This comes down to clever design and using the appropriate insulation thickness. The issue of insulating fixtures such as valves and flanges has already been addressed. Optimizing the insulation thickness depends upon the type of plant, ambient conditions, elevated process temperature and the plant isometrics. This requires a tailor-made approach. But in many cases pipework or equipment is insulated with 50 mm insulation for temperatures up to 250°C. Even a moderate increase to 100 mm with limited effect on installation time and costs can deliver significant extra savings in terms of energy, heating costs and CO_2. The available space between the piping, however, is often insufficient for increasing the insulation thickness. That is why the design of the insulation should start during the design phase of the plant.

Insulating lower temperature processes

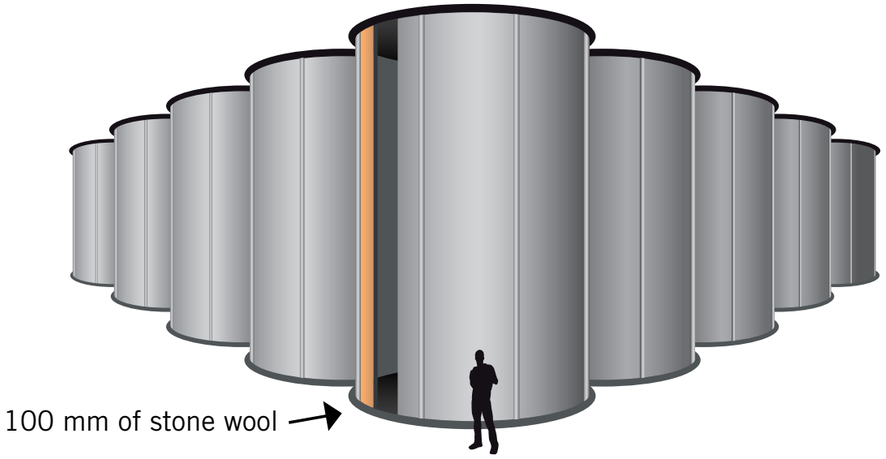
Too often lower temperature processes are not insulated. These warm surfaces may seldom pose a risk for skin-burns, but they do cause a considerably high energy loss.

Impact of 100 mm ROCKWOOL ProRox insulation

A plant having 14 storage tanks for warm fluids – operating at average temperatures between 30°C and 50°C – can actually save 3,400,000 euro in 10 years, if those tanks are insulated with 100 mm of ROCKWOOL stone wool. In addition 38,210 tonnes of CO_2 can be saved in the lifetime of that insulation.

Savings by insulating 14 warm storage tanks

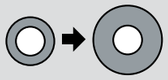
- Investment: 500,000 euro
- Payback time: 1.5 year
- Earnings (10 years): 2,900,000 euro
- CO_2 savings (10 years): 38,210 tonnes



Design conditions: located outdoor, continuous operation, energy costs 0.03 euro/kWh

Increase the insulation thickness

Extra savings — Energy 65,797,600 kWh — Heating costs 1,973,930 euro — CO_2 22,300 tonnes



Design conditions: 10 km piping, temperature: 250°C, energy costs (0.03 euro/kWh), continuous operation, located outside

	Power Plant	Current building code	Passive House
Temperature	250°C - 640°C	18°C - 22°C	18°C - 22°C
Heat loss (AGI Q101)	150 W/m²	< 10 W/m²	< 3 W/m²
Insulation thickness	100 mm	100 mm	350-500 mm

To keep in mind

Average insulation thickness is still the same as 30 years ago. In the meantime the building industry has made substantial improvements in energy efficiency. In accordance with the latest building standards, a cavity wall is insulated with 100 mm insulation, which is still considered to be feasible from a financial perspective. In future this may go up to 350 mm for passive, energy-neutral houses.

Better insulation saves energy, CO_2 and money

Manufacturing plants of all types tend to be used for 25 years or more. If a plant expects to be operating for the next 25 years, then a simple payback calculation should not be a deal killer.

Count your savings

The standard method for evaluating an energy management investment like insulation is to use capital planning measurements such as simple payback period or return on investment (ROI). A better management strategy is to consider the total benefits of the cost of an investment over the effective lifetime of a project. If a given insulation project has an effective lifetime of 25 years, then the financial model needs to reflect its lifetime contribution to the organization after the simple payback period has passed.

The brutal facts

For example, industry estimates indicate that 5 – 10% of all European refineries are badly insulated or uninsulated. This translates into **annual losses of 3.5 billion euro in energy costs**. This represents 150,000 barrels of oil a day, and 20 million tonnes of CO_2 emissions per year. **These losses could be prevented by an investment of 500 million euro**. From a financial perspective a 500 million euro investment yields a 1.7 month payback. Assuming a rather conservative lifetime of 10 years the total energy costs savings may be as much as almost 35 billion euro. If the quality of the insulation is not improved, a forest almost three-quarters the size of Denmark needs to be planted to compensate for these CO_2 emissions.

[Source NCTI]

How to do it?

To achieve substantial savings in energy consumption and CO_2 emissions, always follow the three main guidelines.

- **Inspect and repair:** Make sure that the insulation is promptly and properly maintained.
- **Go all the way:** Insulate all thermal bridges. Even a single uninsulated valve will cause a significant heat loss which will increase the overall energy consumption of the plant.
- **Make it possible:** Upgrade the insulation so that the heat losses are reduced to a minimum. Insulation starts during the design phase of the plant.

Our expert tools

With more than 75 years of experience ROCKWOOL Technical Insulation has built up an in-depth knowledge of insulating technical installations. It also means that we were able to put our entire store of expertise and practical findings into helpful expert tools like ROCKASSIST. This unique calculation program enables you to calculate the ideal insulation thickness and thus maximise energy efficiency and reduce energy costs and CO_2 emissions. The ProRox Process Manual, our other handy expert tool, gives you all the facts on how to install technical insulation. To find out more about our expert tools, please visit our websites www.rockwool-rti.com and www.rockassist.com. If you have any questions or need help please contact our technical sales consultants.

ROCKASSIST

The online expert tool for technical insulation

Simply sign up at **www.rockwool-rti.com** and start using our free expert tool ROCKASSIST right away. It runs on all of the standard operating systems and internet browsers – no installations necessary!

Sustainable solutions

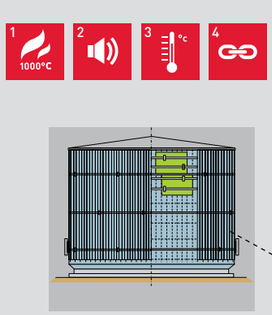
ROCKWOOL Technical Insulation offers a wide range of high quality stone wool insulation products for the insulation of industrial plants. Each of them is developed with a specific field of application (e.g. pipework, boilers and storage tanks) in mind.

ROCKWOOL Technical Insulation products and solutions for industry

- **ProRox pre-formed Pipe Sections:**
  ProRox Pipe Sections are supplied, split and hinged for easy snap-on assembly and are suitable for thermal and acoustic insulation of industrial pipework. ProRox Pipe Sections are available in a wide range of diameters and thicknesses. The use of ProRox Pipe Sections ensures optimal insulation.

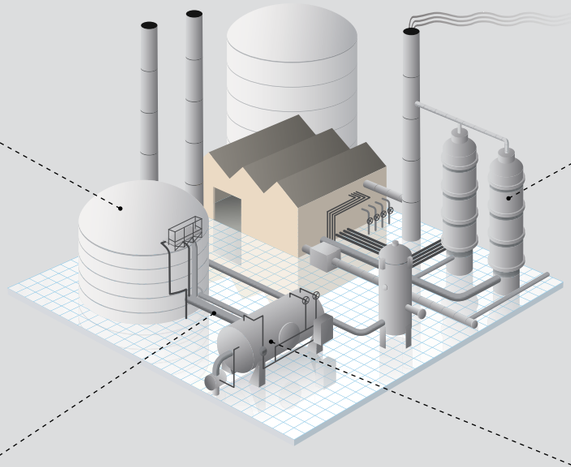
- **ProRox Wired Mats:**
  ProRox Wired Mats are lightly bonded rock wool mats stitched on galvanised wired mesh with galvanised wire. Wired mats are available in a wide range of densities and thicknesses. Stainless steel wired mesh and wire are available upon request. Wired mats are suitable for thermal and acoustic insulation of industrial pipework, boiler walls, furnaces and industrial smoke exhaust ducts. The use of ProRox Wired Mats provides both flexibility and quality of insulation.

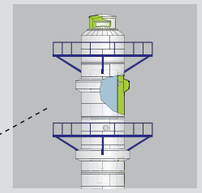
- **ProRox pre-formed Slabs:**
  ProRox Slabs are available in a wide range of densities and well suited to thermal and acoustic insulation of flat surfaces.



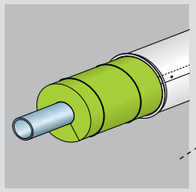
1. Firesafe 2. Acoustical 3. Thermal 4. Durable 5. Sustainable

Storage tanks

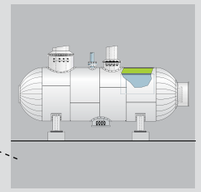




Columns



Pipework



Vessels

Why choose ROCKWOOL stone wool?

ROCKWOOL stone wool products have been proven in service for over 75 years. They will give effective protection and ensure an optimal performance for the lifetime of the installation.

What is stone wool?
Stone wool is a wholly natural material spun into wool from rock. ROCKWOOL stone wool is a natural material formed from one of the earth's most abundant materials – volcanic diabase rock over 200 million years old. ROCKWOOL uses diabase rock from the closest source. This reduces the transport compared to sourcing from further afield and lowers the overall carbon footprint of the ROCKWOOL product. The ROCKWOOL process resembles the natural action of the volcano: stone wool is made by melting rock, limestone and recycled briquettes with other raw materials at 1500°C in a coke-heated cupola furnace. The resultant liquid stone melt is spun into fibres. Binder and impregnating oil are added to make the material stable and water repellent. The stone wool is then heated to about 200°C in order to cure the binder and stabilize the material for final processing into a variety of products. Environmental equipment – filters, pre-heaters, after-burners, and other cleaning and collection systems – makes the 'tamed volcano' an environmentally responsible process.

Sustainable: Independent assessments show that ROCKWOOL stone wool is among the most sustainable products available anywhere, leading to an unrivalled combination of environmental savings, energy reduction, sound insulation and fire safety.

Positive carbon footprint: The more you consume the less you pollute. Insulation is one of the few products that offer this luxury. In its lifetime Rockwool insulation saves more than 20,000 times the CO_2 emitted for the production.

Long lasting: ROCKWOOL stone wool is made by melting volcanic rock which is spun into fibres and bonded into slabs, pipe sections or wired mats. Relying on trapped air for its thermal properties, the use of natural / inorganic materials and our unique production process ensures a long lifetime. ROCKWOOL stone wool will give effective protection and ensure an optimal performance for the lifetime of the insulation.

Safe: ROCKWOOL stone wool is one of the safest materials in the event of a fire; it is non-combustible and does not emit any toxic fumes. Stone wool is a safe material to work with as well as to use in our homes and buildings. This has been confirmed by the latest regulations and tests on product safety.

Zero ozone depleting potential and zero global warming potential: ROCKWOOL stone wool is manufactured using a state of the art production process that does not use, and has never used, harmful gasses such as CFCs, HCFCs, HFCs, in fact any blowing agent that has ozone depleting potential or global warming potential. ROCKWOOL stone wool simply uses air.

Effective: The insulation for buildings and technical installations we have installed around the world in this one year will save nearly 4000 million tonnes of CO_2 in its lifetime. Investing in the insulation of hot pipes and processes can be extremely profitable, with annual returns on investment reaching 100%.

Corporate and social responsibility at the ROCKWOOL Group

ROCKWOOL is a business that has a strong sense of being part of a local community. This translates into having a responsibility and an obligation to that community. This conviction to society and the environment started in the 1950s. It came along long before corporate social responsibility became fashionable, and is at the core of the ROCKWOOL Group values. Established in 1981 by the founding Kähler family, **the ROCKWOOL Foundation** is a non-profit organisation with the objective of supporting scientific, humanitarian, artistic or social goals and contributing to the improvement of the environment and the general development of society.

As a result the ROCKWOOL Foundation has been the largest single shareholder in the company for the past 27 years. Today the ROCKWOOL Foundation research unit is probably Denmark's most respected **non-political think tank for social and economic studies.** These studies, for example, on the efficiencies and inefficiencies of the health care system, are used actively by governments on both sides of the political spectrum to make a better society.

Website: www.rockwoolfonden.dk

Index - Literature

- European Industrial Insulation Foundation (Europe): insulationfoundation.eu
- Verein Deutsche Ingenieure (Germany): www.vdi.de
- National Insulation Association (US): www.insulation.org
- Nederlands Centrum Technische Isolatie: www.ncti.nl
- International Energy Agency: www.iea.org
- European Union: http://ec.europa.eu/clima/policies/ets/
- US Department of Energy: http://www1.eere.energy.gov/industry/
- Steam Digest Volume IV: http://www1.eere.energy.gov/industry/bestpractices/pdfs/steamdigest2003_insulation_mgmt.pdf
- Positive carbon footprint: www.carbon.positive.net
- Mc Kinsey: www.mckinsey.com/clientservice/sustainability/

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