

Industrial Process

Insulation plays a vital role in the design consideration of Industrial Process equipment to provide thermal, acoustic, fire protection and safety benefits



Overview

Industrial Process facilities such as power stations, petrochemical plants, refineries and food and drink factories will have a significant investment in process equipment to ensure consistent results. This equipment must therefore be designed to ensure controllable, efficient and safe operation.



Insulation will play a vital role in the design consideration of this equipment to provide thermal, acoustic, fire protection and safety benefits.

Effective insulation of pipe work, for example, when used to control temperatures, can result in considerable savings in operating costs and the reduction of carbon emissions. Furthermore, insulation increases safety by protecting employees from coming into contact with extremely hot and cold equipment.

The sound absorption properties of insulation should also be taken into consideration to prevent noisy machinery adversely affecting the working environment and creating noise pollution for surrounding properties.

Specifically, insulation should be used by the industrial and mechanical engineer to effectively control:

- operating temperatures for reduced energy costs and consistent production results
- surface temperatures for the creation of a safe working environment
- sound transmission for the prevention of excessive noise breakout.

Advantages

The Knauf Insulation approach to Industrial Process

The Knauf Insulation range of products has been specifically engineered to provide high levels of thermal, acoustic and fire protection insulation for pipes, equipment and vessels forming part of industrial process plant.

Note: For the insulation of heating, ventilation and air conditioning equipment, please [click here](#) to view our solutions for HVAC applications.

Each product within the Knauf Insulation range offers unique benefits, not only for the client, but for the designer, specifier, stockist, contractor and installer.

Industrial Process products from Knauf Insulation

- *Crown Pipe Insulation* - a high quality pre-formed pipe insulation product, which is made from shot-free non-combustible glass mineral wool. It has a factory-applied bright Class 'O' facing with a self-adhesive overlap.
- *Rocksilk Mattress* - a non-combustible rock mineral wool, faced on one or both sides with galvanised or stainless steel wire mesh, providing a firm but flexible general purpose insulating mattress.
- *Crown Universal Slabs* – comprises a range of semi-rigid to rigid shot-free, non-combustible, unfaced glass mineral wool slabs. These can be supplied with a bright Class 'O' facing and in a range of densities from 24 to 48kg/m³ as standard.
- *Rocksilk Universal Slabs* - comprises a range of semi-rigid to rigid inorganic rock mineral wool slabs, noncombustible, bonded with a high performance binder. They are available unfaced or faced with aluminium foil or white tissue and in a wide range of densities from 33 to 200 kg/m³.

Summary

Knauf Insulation offer a range of insulation products, providing solutions for the Industrial Process market depending on the application, and the

required benefits from the insulation..

KEY :

Heat Conservation

Safety

Protecting people against injury from contact with

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 Minimising heat transfer from pipes and vessels to the surrounding environment.

 pipes and vessels, and Industrial Process equipment itself from damage.


Fire Protection

 Preventing fire risk from the content of process equipment, and protecting them from external fire damage.


Acoustic Reduction












 Minimising disturbance to building users from noise transmitted along pipes and from Industrial Process equipment.

Frost Protection

 Preventing the freezing of liquid passing through pipes.

Condensation Protection

 Minimising condensation build-up and corrosion risk to pipes.

Industry type	 Power Station  Chemical Manufacturing  Oil Refineries  Food and Drink Manufacturing  Off Shore Oil and Gas Extraction				
Application	Pipework Below ambient temperatures	Pipework Up to 230°C	Pipework Up to 750°C	Vessels Cylindrical/Curved or irregular shaped	Vessels Rectangular and Flat surfaces
Required benefits of insulation					
Critical ↑ Important Minor Consideration					
					
					
					
					
Products	Crown Pipe Insulation	Crown Pipe Insulation	Rocksilk Mattress	Crown Universal Slabs Rocksilk Universal Slabs Rocksilk Mattress	Crown Universal Slabs Rocksilk Universal Slabs Rocksilk Mattress

Requirements of Pipe & Duct Insulation

Requirement



Heat Conservation

Minimising the loss of heat from the working fluid to the surrounding environment will save energy and cost. Returning un-used energy to the heat source for recirculation will reduce fuel demand, with associated energy cost savings. Higher return temperatures also improve appliance performance, with faster heat-up times and operation at optimum temperature. Heat lost because of insufficient insulation cannot usually be recovered, thus wasting the fuel energy used to produce it. The temperature of the working fluid is usually controlled by a boiler/heater. If insulation minimises transmission losses, (and these are predictable), then enduser conditions are more stable and less subject to outside influences.



Safety

The possibility of human contact with heated or chilled pipes and vessels introduces a risk of injury. A suitably finished insulation cover will increase personnel protection. Pipes and vessels can also create obstruction hazards, but the resilience of glass and rock mineral wool insulation is an effective cushion. Uncontrolled losses from pipes and vessels can create discomfort by affecting environmental conditions or conflicting with control measures. Insulation on large vessels must be able to resist occasional foot traffic.



Fire Protection

Fire risk must be minimised by using noncombustible materials wherever possible. Service connections between these areas should be protected by a heat resistant layer to provide a stipulated period of fire protection. In addition to protecting the building and its occupants, fire precautions may be required for specific local considerations. Materials with a low melting point, such as plastics, may need protection from overheating or against fire from a local heat source. Volatile materials in containers or pipes may also require extra protection against overheating or exposure to flame.



Acoustic Protection

Noise transmission into occupied areas from mechanical services machinery can be a serious nuisance. Liquid and gas movement in pipes and vessels can also generate noise from turbulence. Noise

Product Selection Considerations

- Glass and rock mineral wool both withstand high temperatures
- Crown Pipe Insulation is suitable for use with operating temperatures up to 230°C - ideal for HPHW and steam pipes.
- All glass mineral wool and rock mineral wool are robust.
- Glass mineral wool is easy to cut and work with.
- Glass and rock mineral wool joints are naturally sealing and prevent extra heat loss through open joints.
- Glass mineral wool and rock mineral wool are resilient.
- Phenolic foam is brittle, which can result in damage and gaps at joints and fittings.
- The mineral wool of all Crown and Rocksilk Industrial Process products is non-combustible.
- All products are classified as noncombustible.
- Crown and Rocksilk products do not emit smoke or toxic fumes nor propagate fire.
- Glass mineral wool and rock mineral wool have excellent

does not have to be loud to cause problems. Low-level continuous sounds can also be stressful and disruptive. The damping effect of mineral wool insulation can reduce the vibration noise from a pipe or duct, which might otherwise be transmitted from one area to another. Noise from machinery such as pumps, fans etc. will be greatly reduced by the acoustic absorption effect of glass mineral wool and rock mineral wool insulation, as will disruption from the noise of turbulent flow in pipes and vessels.



Frost Protection

If aqueous solutions are left static, there is a risk of freezing in low ambient temperatures. This risk is increased by the effect of draughts causing a chilling effect to exposed surfaces. Frost protection can be achieved with the use of 'trace heating' elements wrapped around pipes to contribute a low heat input and keep temperatures above freezing. The running cost and effectiveness of this low grade heating is greatly improved by using pipe insulation to retain the heat.



Condensation Protection

The moisture-carrying capacity of the air is related to its temperature. When moist warm air comes into contact with cold surfaces – e.g. pipes – the air is cooled and will produce moisture on the cold surface. Condensation can be hazardous if it drips onto floors, creating dangerously slippery surfaces underfoot. Condensation can also corrode steel pipes and their supports. Continual moisture contact or dripping can result in cosmetic water damage to surfaces, fungal infestation, or even rotting of susceptible materials.

acoustic absorption characteristics that significantly reduce noise from pipes and vessels.

- Glass mineral wool and rock mineral wool provide excellent thermal insulation
- Crown Pipe Insulation with an aluminium foil finish works as an integral vapour check when effectively sealed with foil jointing tape.
- High levels of stress corrosion inhibitors and low levels of chloride present in Crown Pipe Insulation significantly reduces potential for austenitic stainless steel pipes.
- Glass mineral wool and rock mineral wool provide excellent thermal insulation. Crown Pipe Insulation with an aluminium foil finish works as an integral vapour check when effectively sealed with foil jointing tape.

Detailed Design Considerations

Advantages of glass and rock mineral wool insulation in Industrial Process applications:

- Excellent thermal properties of glass and rock mineral wool offer efficient control of operating temperature giving more consistent and cost effective production
- The benefits of excellent thermal properties also increase personnel protection by removing exposure to extreme hot and cold surface temperatures of pipes and vessels
- Both glass and rock mineral wool offer inherent sound absorption benefits reducing the risk of noise breakout affecting the immediate working environment and surrounding properties
- Non-corrosive to austenitic stainless steel pipes, which can increase the longevity of the process equipment and reduce maintenance costs
- Both glass and rock mineral wool products are non-combustible to BS 476: Part 4 1970 (1984), offering the highest level of fire safety
- Jointing of both glass and rock mineral wool products is easy and effective as the material naturally 'knits' together to minimise heat loss through the joints
- Both product types are flexible and non-brittle which helps to reduce damage during and after installation
- High density rock mineral wool products are available for use on vessels where foot traffic may be a consideration

Advantages of Knauf Insulation Industrial Process products:

- Easy to understand, solution-based literature
- A Technical Advisory Centre for design and installation queries
- Potential to combine order with other insulation products
- Standard products stocked in UK
- Potential for fast fulfilment of bespoke orders
- Long 1200mm sections for faster installation on pipework