

A photograph of an industrial facility featuring a complex network of large, silver-colored pipes. The pipes are supported by a black metal framework and are set against a clear blue sky. The pipes are wrapped in a white, textured insulation material. The perspective is from a low angle, looking up at the pipes, which creates a sense of height and scale. The overall scene is brightly lit, suggesting a sunny day.

ProRox
Industrial insulation

ProRox MB/SB 960 pipe bends

Innovative solutions for the
insulation of pipe bends

ROCKWOOL®
TECHNICAL INSULATION



Technical insulation shaped by experts

We share our knowledge to your advantage

ROCKWOOL® Technical Insulation – a part of the ROCKWOOL International Group – offers innovative technical insulation products and solutions based on stone wool for the process industry and the shipbuilding & offshore market worldwide.

To that end, we have subsumed our product range into two specialist categories. ProRox® covers all our insulation solutions for the process & power generation industry and SeaRox® comprises the full marine and offshore range. Through our two product lines, our experts offer a full spread of sustainable stone wool products and systems guaranteeing the highest possible thermal, acoustical, fire safe and durable insulation of all technical installations.

We have more than 75 years of experience, reflected in a complete set of high-grade products and expert advice. We remain fully committed to providing the very best service on the market and a complete range of cutting-edge insulation solutions.

All ROCKWOOL Technical Insulation solutions meet the most stringent quality and safety standards. All ProRox and SeaRox products and constructions have been tested according to the latest regulations and approved by all major classification societies. As an innovation-driven company we demand excellence. In every segment we keep searching for new systems, methods and solutions. Our experts will be delighted to share their knowledge and advise you in drawing up technical and project specifications.



Contents

Introduction	2
Insulation of pipe bends Complex situations, difficult applications	5
The challenge	5
The problem	5
The solution ProRox PS pipe sections and ProRox pipe bends: an excellent combination	6
Two variants	6
Big time savings	7
Simple installation	8
Handling	8
Prefabricated ProRox pipe bends Better for installers and owners/operators	8
Product overview of pipe bends	9
Dimensional overview	9
Product properties	10

Keep track of our insulation system solutions. Order the ProRox Process Manual at www.rockwool-rti.com





Insulation of pipe bends

Complex situations, difficult applications

Industrial installations in the chemical, petrochemical and energy sectors are generally complex constructions designed for equally complicated processes. These mostly run in parallel with various systems and devices (e.g. boilers, distillation columns, and vessels).

Intricate piping systems must streamline the **permanent medium and energy flows**. **High-quality thermal insulation** of these pipelines should ensure the right transport conditions, with minimal energy loss.

The challenge

Limited space and the wish for the shortest possible pipelines often result in costly **pipings designs with many bends**. On average, there is at least one bend every four to six metres. This creates major challenges for the pipe insulation fitter.

Straight pipes can be easily and efficiently insulated using pipe sections (e.g. ProRox PS 960). Pipe bends are more difficult. In practice, correct execution not only depends on the **expertise of the specialist**, but also on the time that can be devoted to the insulation of pipe bends and the material used. As a result, insulation often has quite a few shortcomings.

The problem

From experience, ROCKWOOL Technical Insulation knows that **quality issues associated with the insulation of pipe bends** can be broken down into three categories:

- **Pipe sections are manually cut into segments on site. As a result,** large seams often arise between segments, leading to heat losses.
- **The cladding is filled with loose fill on the bends.** It is not easy to ensure even filling. So high insulation quality is not always guaranteed.
- **The sheet material of the cladding is cut into pieces ('fish').** Inaccuracies and gaps in the insulation system can occur. This also leads to significant heat losses.

Naturally, inaccurate insulation of pipe bends has a negative impact on the quality of the pipe system. This can lead to:

- an **uneven surface temperature** with potentially inadequate personal protection and an increased risk of burns if touched;
- **higher thermal losses** in the area of the pipe bends;
- and a **higher risk of coagulation or crystallisation** in critical process media.

The solution

ProRox PS pipe sections and ProRox bends: an excellent combination

In addition to the ProRox PS 960 pipe sections for industrial insulation, ROCKWOOL Technical Insulation has introduced ProRox MB 960 and the ProRox SB 960 prefabricated bends. The combination of these products guarantees optimum pipe insulation.

Two variants

ProRox MB 960 and ProRox SB 960 are **non-combustible, prefabricated stone wool pipe bends** for the thermal and acoustic insulation of industrial pipe systems. Two variants are available, depending on the size.

■ **ProRox MB 960 pipe bends** are cut out as a whole piece from a stone wool block, exactly following the geometry of the pipe bend.

■ **ProRox SB 960 pipe bends** are made up from glued segments that have been cut from off-the-shelf ProRox PS 960 pipe sections. The segments are constructed to create a gentle curve that follows the piping.



Both pipe bends **fit precisely** and are **cut into two parts lengthwise**, which enables **easy installation**.

Big saving in time

Work with ProRox MB 960 and SB 960 pipe bends is much faster than with manually produced bends. Compare the operations in the table below.



■ Manually produced pipe bends

- Step 1** Measure the bend.
- Step 2** Calculate the segments (number and mitre).
- Step 3** Mark cutting lines or make a template (for example, on the basis of existing plate segments that do not fit precisely).
- Step 4** Cut the segments with an insulation knife or saw. The angled intersection of the end segments requires particular attention.
- Step 5** Mount and position the separate pipe segments.
- Step 6** Secure each segment with binding wire.
- Step 7** Where necessary, apply loose fill between the segments.



■ Application of prefabricated pipe bend

- Step 1** Measure the bend for the order.
- Step 2** Fit the prefabricated pieces in one action.
- Step 3** Secure the prefab pipe bend with binding wire (this is easier and requires less binding wire).

Simple installation

Industrial insulation is often fitted from scaffolding. The manual cutting of good quality segments is a big challenge in these conditions. It can also have an additional negative influence. Which is why the individual segments are often prepared in advance in the workshop. This enables the specialist to meet various logistical and organisational challenges. ProRox prefabricated pipe bends eliminate these problems and provide a simple and efficient solution to ensure an excellent result in all conditions.



Easy handling

The ProRox pipe bends consist of only two parts. They can be easily mounted onto the pipe bend due to their excellent fit. The bend is then secured with galvanised binding wire. Binding wire (0.5mm) with at least two turns per bend is recommended. For larger bends, three turns per metre should be used as a guideline.

The segments are glued together in the factory, making the elaborate structures of individual segments a thing of the past. The angled ends mean that additional pipe insulation with ProRox PS 960 can be easily attached. ProRox MB 960 and SB 960 precisely follow the outer contours of the pipe bend. This ensures that the cladding is also easy to assemble, regardless of segment size.

Prefabricated ProRox pipe bends

Better for installers and plant owners

The use of ProRox PS 960 pipe sections in combination with ProRox pipe bends offers numerous advantages for both insulation contractor and installation owner/operator.

Owner/operator	Installer/contractor
Even surface temperature	Time-saving
Less risk of temperature peaks	Less waste from offcuts/excessive individual segments
Less risk of (burning) accidents	Uniform finish with steel casing possible
Optimum insulation for the entire piping network	Flexible ordering; ordered by piece
No 'leaks', so maximum energy savings	Greater flexibility in use of personnel
Less risk of solidification / crystallisation of the insulated liquid	

Product overview of pipe bends

Dimensional overview



■ ProRox MB 960

- Delivery of a tailor-made bend possible
- Prices are available on request.



■ ProRox SB 960

Dimensional Overview ProRox MB 960 and SB 960 series												
Prices on request												
Insulation thickness in mm												
Ø mm	25	30	40	50	60	70	80	90	100	110	120	
18												
22												
28												
35												
38												
42												
48												
57												
60												
64												
70												
76												
83												
89												
102												
108												
114												
121												
127												PROROX MB 960 RANGE
133												
140												
159												
169												
178												
194												
205												
219												
230												
245												
253												
267												
273												
280												
305												
324												
356												
368												
406												
419												
456												
508												PROROX SB 960 RANGE
558												
610												
660												
712												
762												
813												

Product properties



ProRox MB 960

Product description

ProRox MB 960 is a pre-formed stone wool pipe bend that is cut to size from a stone wool block. The preformed shell precisely follows the geometry of the pipe bend.

Application

ProRox MB 960 pipe bends are used for thermal and acoustic insulation in industry.

Dimensions

ProRox MB 960 is available for pipe diameters of 18-324 mm. The maximum insulation thickness is 120 mm. As standard, the prefabricated pipe bends are supplied as a 90° model with a radius of 1.5 D according to EN 10253-1. Other dimensions and shapes (radius, angle) are available on request.

ProRox MB 960 product properties

	Performance*					Norms
	T [°C]	50	100	150	200	
Thermal conductivity	T [°C]					EN ISO 8497
	λ [W/mK]	0,043	0,05	0,061	0,074	
Maximum service temperature	400°C					EN 14707
Reaction to fire	Euroclass A1 _L					EN 13501-1
Nominal density	> 100 kg/m ³					EN 13470
Water absorption	< 1 kg/m ²					EN 13472
Water vapour diffusion resistance	$\mu = 1$					EN 14303
Air flow resistivity	> 30 kPa s/m ²					EN 29053
Designation code	MW EN 14303-T9(T8 if Do<150)-ST(+)-400-WS1					EN 14303
	ProRox MB 960 meets EN 14303:2009+A1:2013					

*ProRox MB 960 is cut from a solid block of ROCKWOOL stone wool that has at least the same performance characteristics as the material from which ProRox PS 924 PL pipe sections are cut. The performance figures stated in the table above are therefor based on the ProRox PS 924 PL product.



ProRox SB 960

Product description

ProRox SB 960 is a pre-formed stone wool pipe bend constructed from glued segments that have been cut from the ProRox PS 960 pipe sections. The longitudinally cut mouldings fit together perfectly.

Application

ProRox SB 960 pipe bends are used for thermal and acoustic insulation in industry.

Dimensions

ProRox SB 960 is available for larger diameters (> 324 mm) and insulation thicknesses.

As standard, the prefabricated pipe bends are supplied as a 90° model with a radius of 1.5 D according to EN 10253-1. Other dimensions and shapes (radius, angle) are available on request.

ProRox SB 960 product properties

	Performance*								Norms
	T (°C)	50	100	150	200	250	300	350	
Thermal conductivity	λ (W/mK)	0,04	0,046	0,054	0,064	0,077	0,092	0,111	EN ISO 8497
Maximum service temperature	650°C								EN 14707
Reaction to fire	Euroclass A1 _L								EN 13501-1
Nominal density	> 100 kg/m ³								EN 13470
AS quality	Chloride content < 10 mg/kg								EN 13468
Water absorption	< 1 kg/m ²								EN 13472
Water vapour diffusion resistance	μ = 1								EN 14303
Air flow resistivity	> 80 kPa s/m ²								EN 29053
Designation code	MW EN 14303-T9(T8 if Do<150)-ST(+)-650-WS1-CL10								EN 14303
	ProRox SB 960 meets EN 14303:2009+A1:2013								

*ProRox SB 960 is made from ProRox PS 960. The performance figures that are stated in the table above are therefor based on the ProRox PS 960 product.

ROCKWOOL Technical Insulation

ROCKWOOL Technical Insulation, an organisation of the international ROCKWOOL Group, is the worldwide market leader in technical insulation. With our two product lines, ProRox and SeaRox, we cover the whole industrial market and the marine & offshore industry, providing a full range of products and systems for the thermal and firesafe insulation of technical applications. In addition to sustainable products we provide reliable expert advice, from documentation to delivery and after sales service. Throughout the whole chain from specifier, through dealer to contractor and fitter we aim to add value. We do not just sell products, we supply solutions. It is this total approach that makes us the ideal choice when professionalism, innovation and trust are valued.

All explanations correspond to our current knowledge and are therefore up-to-date. The examples of use outlined in this document serve only to provide a better description and do not take special circumstances of specific cases into account. ROCKWOOL Technical Insulation places great value upon continuous development of products and we too continuously work to improve our products without prior notice. We therefore recommend that you use the most recent edition of our publications, as our wealth of experience and knowledge is growing all the time. Should you require related information for your specific application or have any technical queries, please contact our sales department or visit our website at www.rockwool-rti.com

The ROCKWOOL Group

The ROCKWOOL Group is the world's leading supplier of innovative products and systems based on stone wool. We create sustainable solutions to protect life, assets, and the environment today and tomorrow. Stone wool is a versatile material based on one of nature's most abundant resources - volcanic rock.

It forms the basis of the following ROCKWOOL Group businesses:

- *Insulation business:* building insulation; industrial & technical insulation for process industry, marine and offshore; customised solutions for industrial applications and wall systems (External Thermal Insulation Composite Systems).

- *Systems business:* acoustic ceilings and wall systems; exterior cladding systems; horticultural substrate solutions; engineered fibre solutions (for the automotive industry and others) and noise and vibration control systems.

The ROCKWOOL Group was founded in 1909 and insulation production started in 1937. The Group's head office is located close to Copenhagen. In 2015, the Group generated net sales of EUR 2.208 million. The company is listed on the NASDAQ Copenhagen stock exchange. The Group has a large presence in Europe and Russia, a rapidly growing position in North America and facilities in Asia. With 10,601 employees in 37 countries, we support customers worldwide.

For more information, please visit www.rockwool.com.

ROCKWOOL Technical Insulation

Delfstoffenweg 2
6045 JH Roermond
Nederland
Tel. +31 (0) 475 35 36 18
Fax +31 (0) 475 35 36 01
E-mail: info-rti@rockwool.nl
www.rockwool-rti.com

ROCKWOOL Technical Insulation
is part of ROCKWOOL International A/S

ROCKWOOL®
TECHNICAL INSULATION

ROCKWOOL Technical Insulation, ROCKWOOL, SeaRox and ProRox are registered trademarks of ROCKWOOL International. ROCKWOOL Technical Insulation reserves the right to change the information in this brochure without prior notice.