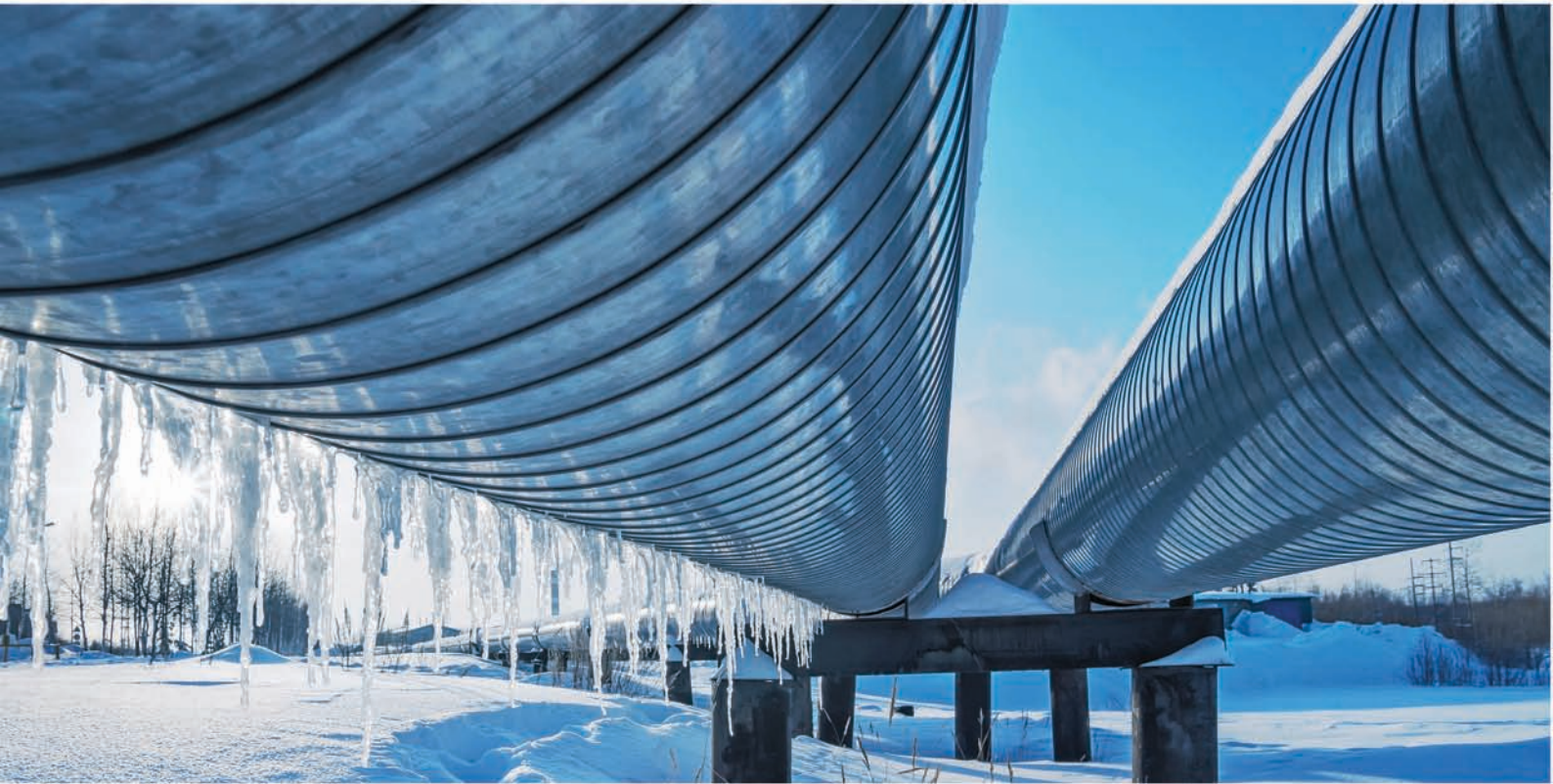


PIPE SOLUTIONS

for the refrigeration industry



PRE-INSULATED PIPING
FOR THE
REFRIGERATION INDUSTRY



ABOUT US



Jabitherm Rohrsysteme AG designs and manufactures pre-insulated pipes designed for transport of liquids and solids for the chemical, gas, oil, and cooling industries, and for beverage and food industry.

High product standards, following diverse customer requirements, and the ability to create complex pipe solutions for complex site situations are our goals.

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JABITHERM ROHRSYSTEME AG

EXPERTISE SINCE 1984

Jabitherm Rohrsysteme AG was founded in 1984 starting with one manufacturing facility in Troisdorf near Cologne in Germany with the production of buried district heating pipes. Due to the specialization in the chemical industry, Jabitherm Rohrsysteme AG noticed the need for the development of a completely new system.

Contrary to district heating, pipes for chemical industry are installed above ground – birth of the RAPID pipe system.

Following this release, the cooling industry discovered the suitability of these pipes also for their sites. Even though the system seems to be easily adaptable, the deviating requirements for insulation and installation challenged Jabitherm Rohrsysteme AG once more.

The answer to this challenge resulted in the development of the RAPID pipe system into two different product series: RAPID-ESP and RAPID-COOL.

The overwhelming success and increasing request for RAPID products initiated the demand for an increase of production capacity. It resulted in the founding of a second manufacturing base at Bad Lausick, close to Leipzig in Germany.

Just after that milestone, Jabitherm Rohrsysteme AG started searching for new markets. The focus fell in the Beverage and Food industry. Again Jabitherm Rohrsysteme AG was challenged to modify the products according to market requirements.

Today these efforts have found their reward in a large market share in this branch.

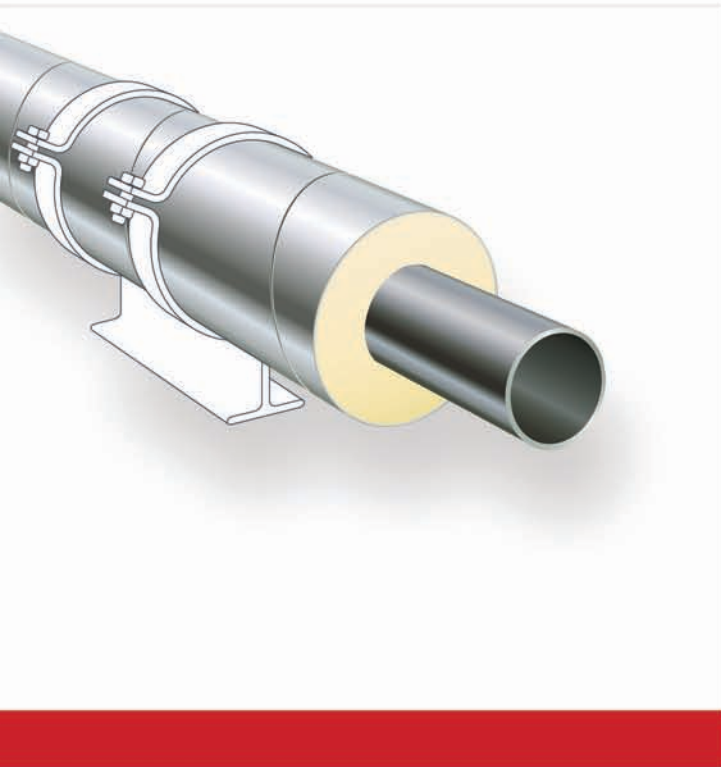
Nowadays Jabitherm Rohrsysteme AG products can be found globally at many sites. Supporting the close contact to the customer, Jabitherm Rohrsysteme AG is a company with the ability to create product solutions for any kind of requirement.



Furthermore Jabitherm Rohrsysteme AG has set new standards for extreme conditions, implemented in solutions such as product series FIRESAFE® - pipes, designed for high performance in hazardous and flammable environments.

Easy-to-handle joints for the connection of bare pipe ends complete the whole scale of the pre-insulated pipe system.

PRE-INSULATED PIPE SYSTEMS



In the case of heat tracing for e.g. frost protection or temperature maintenance, RAPID- and FIRESAFE® pipe systems can be prepared for integration of heating cables, heating tapes or warm water systems.

Pipe sections are delivered generally in 6 or 12 m lengths, complete with all components to perform as a part of the pipeline system. Bare pipe ends are prepared factory-side for a fast and easy connection to existing pipes.

As a consequence of the high impact resistance of the rigid foam, supports and clamps can easily be installed on the outer jacket. This prevents thermal bridges building between the support and the inner medium pipe.

Pre-insulated pipes are generally designed to prevent the medium from deviation of set. The roots for development of this type of product can be found in district heating pipes. Their central function is the transport of heat over long distance runs.

The main advantage of pre-insulated pipes: They always arrive completely insulated at place of installation. Medium pipe, thermal insulation and outer Jacket require just connecting to install a complete pipeline. A big advantage: The insulation effect is controlled and is guaranteed constant in contrast to the inferior type of pipe insulation done by hand.

In contrast, Jabitherm Rohrsysteme AG manufactures pre-insulated pipe systems for applications above ground. Completely different logistical and technical requirements need to be fulfilled.

The influence of weather (wind, rain, sun, etc.) or method of installation and maintenance must always be taken into account. In consequence, Jabitherm Rohrsysteme AG can change the sheathing from PE to a spiral-fold sheet metal jacket, using different materials.

Our systems are always in full accordance with the application and customer specifications, and focus on the development of specialized insulation systems. Our focus is on steady improvement of quality, reliability, total cost of ownership and a high safety level for installation and adherent surrounding.

The characterizing high effective and solid foam insulation combined with low heat loss ensures continuous flowability of medium, no risk of solidification, prevention of condensation and steady operating conditions over it's whole life time.

CONCEPT OF PRE-INSULATED PIPES

The concept of pre-insulated pipes of Jabitherm Rohrsysteme AG is based on a common practice and assembly: **medium pipe – thermal insulation foam – outer jacket**.

The characteristic of Polyurethane insulation foam (PUR) fits perfectly into the concept of pre-insulated pipes:

PUR has a very high adhesive power to bond surfaces together.



A **bonded pipe system** is created. The system performance is superior to conventionally insulated pipes, because the carrier pipe encased by the insulation foam in a metal jacket acts as one strong unit better able to resist external forces. So sliding supports can be mounted on the outside jacket which is not possible if traditional insulation is specified.

The wide range of metal alloys available for the medium pipe means performance can be perfectly matched to site requirements.

Combined with the options of standard or fire-resistant polyurethane foam insulation, a wide range of site conditions can be covered.

The range of sheet metals available for the metal jacket enables design engineers to specify mechanical and corrosion resistance for any environment.

a= jacket

aluminium
aluzinc
stainless steel
PE

b=insulation layer

polyurethane foam system
- fire retardant
- standard

c= carrier pipe

steel/stainless steel
GRE
PE-PP-PTFE
customer specification

TECHNICAL PERFORMANCE

OF THERMAL INSULATION



FIGURES:

Temperature range: -200 °C to +120 °C

Lambda value: 0,027 W/mK
(at 20°C (68 F), 70 Kg/m³)

Impact resistance: 0,15 MPa at 10% rel. strain

Closed cell content: min. 88%

Thermal foam insulation dedicated to pre-insulated pipe systems consists of closed-cell foam. This foam insulation can be used as a single or multi-layer according to the requirements of the operation.

Decisive for the number of layers is the operating temperature (range -200°C to +120°C), fire resistance/use inside hazardous areas and mechanical influences on the pipe.

The effectiveness of the thermal foam insulation is important and is related to the density of the foam material.

An increased insulation foam density creates a strong connection between insulation material, medium pipe and outer jacket.

At the same time a higher density increases the thermal conductivity and thus a higher heat loss to the environment.

A lower density level leads to a decreased impact resistance but reduces heat loss.

This demonstrates that the construction of a pre-insulated pipe is a kind of successful adaption between all the factors involved.

The modularity of the product allows an easy adjustment following the requirements of ambient and operating conditions.

The outer jacket is manufactured as a spiral-wrap pipe made of metallic sheets with an inside fold to create a smooth surface - moisture and dust tight.

BENEFITS

OF PRE-INSULATED PIPES

The features and benefits of Jabitherm pre-insulated pipe systems compared to conventional pipe systems with mineral wool insulation:

Supports assembled on outer casing

- ▶ **no** thermal bridges, **no** corrosion

Step-resistant insulation

- ▶ **increased** lifetime, **low** maintenance

High level of prefabrication

- ▶ **reduced** scaffolding effort
- ▶ **minimized** installation time and **low** safety risk on site

Reduced insulation thickness while maintaining thermal transfer rate

- ▶ **high** pipe bridge volumes possible



Superior thermal insulation performance

- ▶ **reduced** energy consumption
- ▶ **reduced** CO₂ emissions

Diffusion-proof insulation

- ▶ **no** condensation, **no** formation of ice

Bonded system performance

- ▶ **wider range** of bearing systems possible

Minimal insulation required on site

- ▶ **fast** installation time

▶▶ **REDUCED TOTAL COST OF OWNERSHIP**

PRODUCT SERIES

The product range of Jabitherm Rohrsysteme AG is represented by two different series: RAPID and FIRESAFE®.

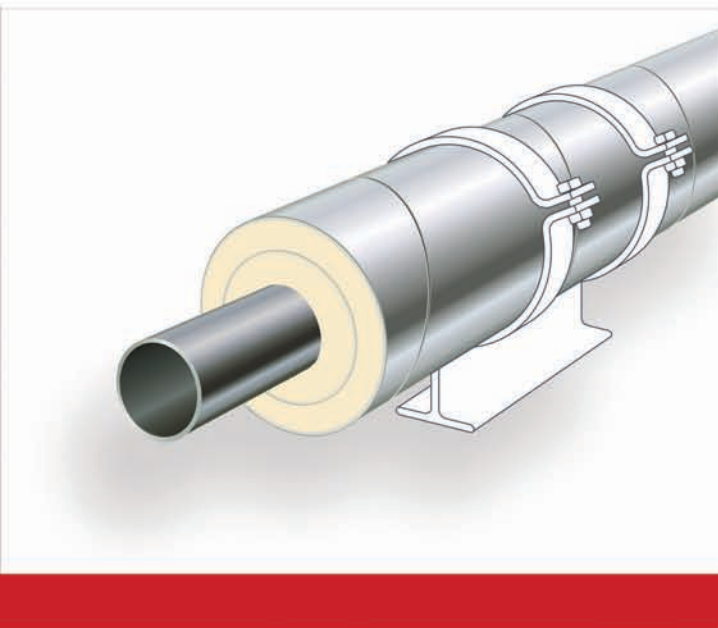
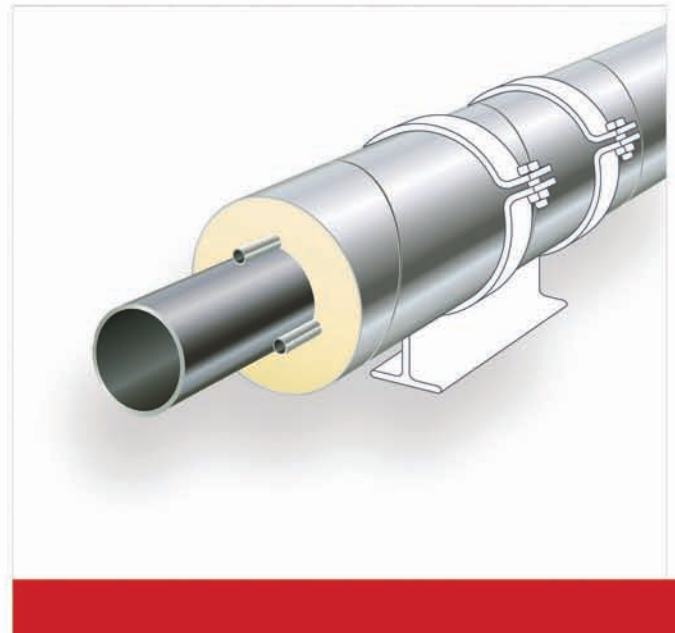
The preferred application areas for pre-insulated pipes RAPID are refrigeration, food and beverage industries.

The most important aspects for these products are fast and easy installation and high level of performance. Therefore this product series is differentiated according to their application and design in two lines:

RAPID-ESP and RAPID-COOL:

- ESP stands for Energy Saving Pipe, designed for systems with consideration on low energy consumption.

The specially created high efficient polyurethane insulation foam reduces the insulation layer thickness up to 30% compared to same insulation property of conventionally insulated systems.



- COOL characterizes the design for applications at low operating temperature. The diffusion-resistant sheathing protects the pipe system against the ingress of water and dust.

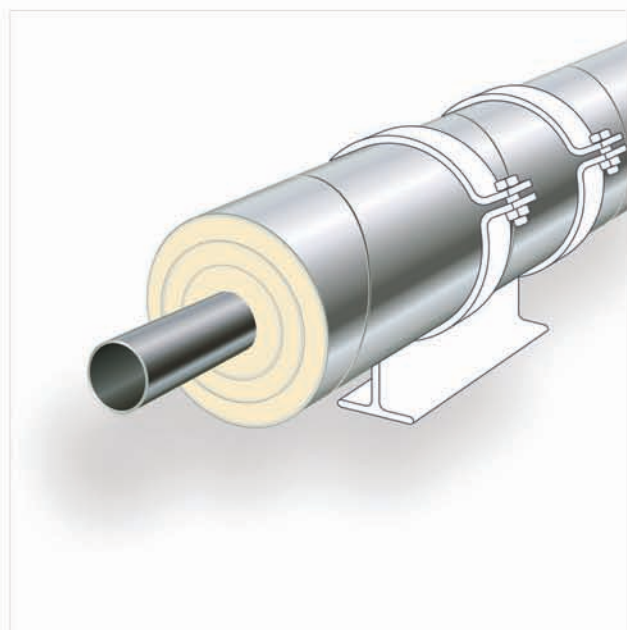
Additionally it prevents condensation and formation of ice on the outer surface. As a variation of the RAPID-COOL pipe system, the RAPID-CRYO covers applications with medium temperatures down to -200°C.

FIRESAFE®

FIRESAFE® pipe design fulfills the special requirements for installation in inflammable atmospheres and for operation inside potentially explosive areas (ATEX).

The fire-resistant system withstands open fire up to 90 minutes (criteria: warming of the carrier pipe < 450 °C).

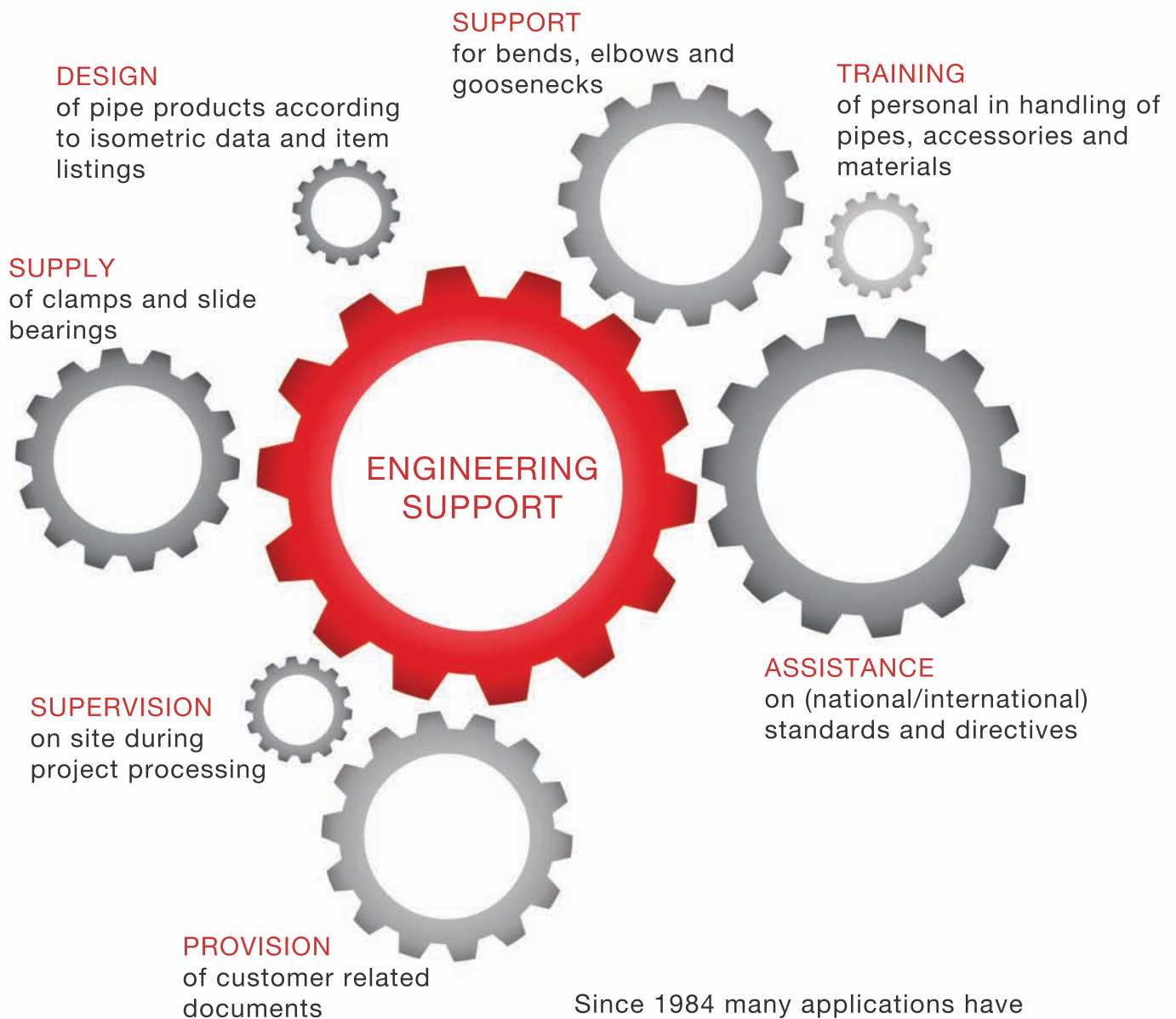
Three classifications differentiate the product series of FIRESAFE®:



- T30 pipe system is based on a single polyurethane foam layer with special fire protection additives. Fire resistance time: 30 minutes
- T60 similar to FIRESAFE®-T30, but has two layers of thermal insulation foam separated by a metallic layer. Fire resistance time: 60 minutes
- T90 similar to FIRESAFE®-T30, but has three layers of thermal insulation foam each separated by a metallic layer. Fire resistance time: 90 minutes

Both product series are available prepared for implementing a heat tracing system. Pipe systems can be provided with outside diameter sizes between 80 and 900 mm. All deviations from these standard diameters require a implementation check and evaluation.

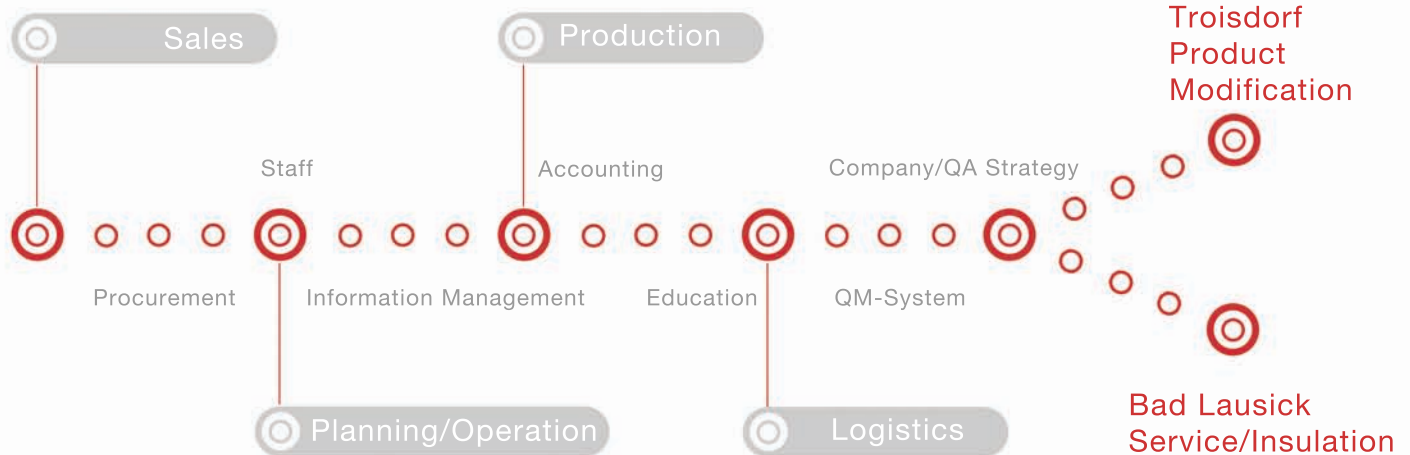
SERVICES



Since 1984 many applications have been equipped with pre-insulated pipes from Jabitherm Rohrsysteme AG. Based on this experience we offer today a comprehensive service package containing support on design, installation and maintenance at site.

PRODUCT MODIFICATION

AND QUALITY ASSURANCE



Product modifications required by customers request or general improvements follows specifications and predefined monitoring processes.

These processes are accompanied by regulations and procedures based on DIN EN ISO 9001 standard.

The effectiveness of all actions is validated by designated employees.

Our inspection & test plan contains supplier's and sub-supplier's supervision. The order processing survey starts with the order entrance in manufacture and finalizes in dispatch documents.

All processes are under surveillance of recommendations in DIN EN ISO 9001. Approved, recorded and safely stored.

The QM-System is annually re-certified by a German notified body for each manufacturing unit.

Current certificates are available on the website www.jabitherm.com.



CUSTOMERS AND APPLICATIONS

Over a time period of more than 30 years, Jabitherm Rohrsysteme AG pipe systems operate in many applications and sites. Independently from the product series the customers come from the following branches:

Chemical and Petrochemical industry:

chemical liquids (e.g. ethylene, acid/lye, ammonium, sulfur)

Oil and Gas industry:

bunker oil, light oil, gases
(e.g. N₂, LNG, NH₃)

Breweries, Dairies, Food industry:

liquids (e.g. water, mash) cacao butter, fats, milk, condiments

Refrigeration industry:

cooling agents (e. g. water, brine, CO₂)

Fields of application:

temperature maintenance and increase frost protection

REFERENCES



INTERNATIONAL OPERATING CUSTOMER ACTIVE IN GAS INDUSTRY, BITTERFELD GERMANY

Pre-insulated pipes with a nominal diameter of DN 40 have been manufactured by Jabitherm Rohrsysteme AG in 2014 for operation at sites carrying liquid nitrogen at process temperatures of -196°C .

For those extreme conditions the choice fell on the pipe system RAPID CRYO, especially designed to fulfill these requirements.

Configured with diffusion-tight, three-layer jacketing system and insulation thickness exceeding 115 mm, the system assures safe and long-term reliable operation.



REFERENCES



COLD STORAGE HOUSE AT RAUNHEIM, GERMANY

A german food retailer operates a large centralised cooling warehouse in Raunheim close to Frankfurt/Main.

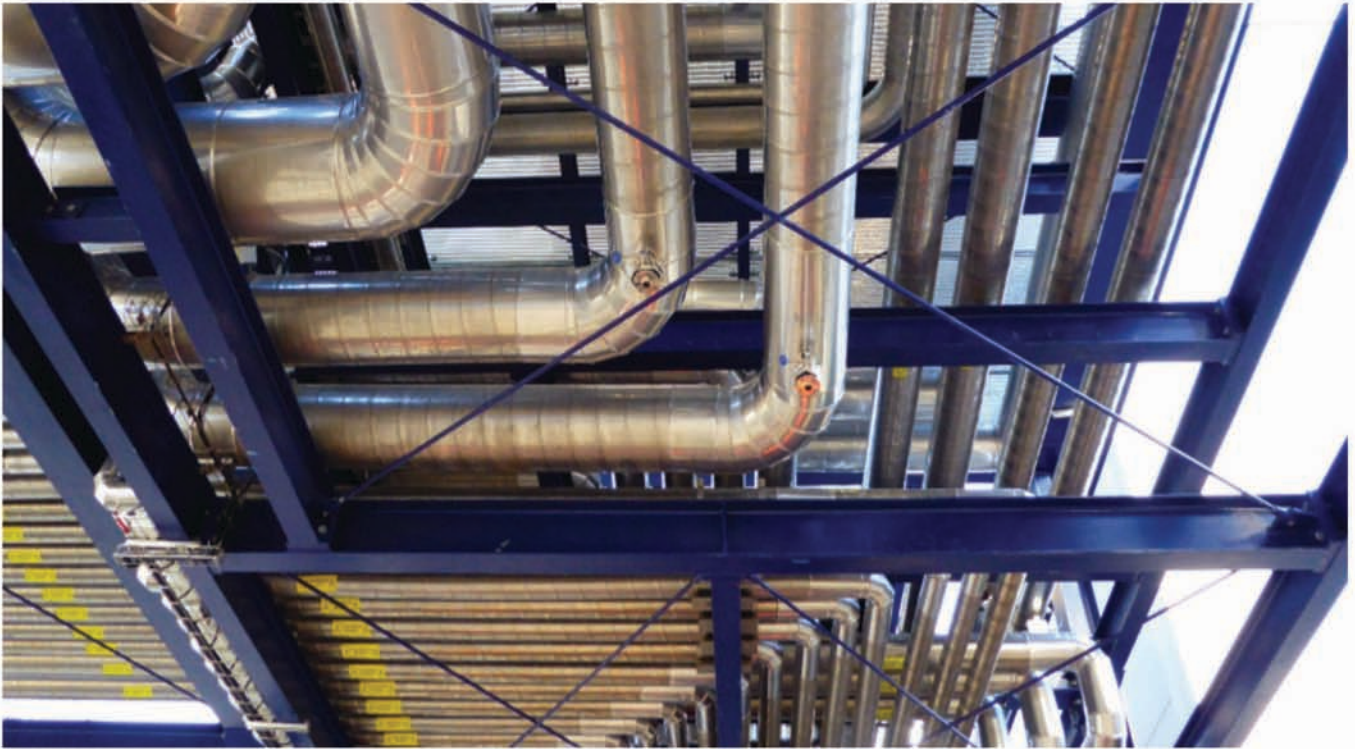
More than 10,000 m of pre-insulated pipes provided by Jabitherm Rohrsysteme AG ensure here since 2011 ideal process conditions.

For transfer of media like CO₂, NH₃, brine and temperatures between -35°C and +50 °C are substantially essential.

This demand is completely covered by pipe system RAPID-COOL, installed at nominal diameters between DN 15 bis DN 300.



REFERENCES



BREWERY IN BAVARIA, GERMANY

Different versions of pre-insulated pipes, designed and manufactured by Jabitherm Rohrsysteme AG, got implemented in a construction project of a famous bavarian brewery in 2015.

Together with process lines the installation comprised pipes carrying liquid carbon dioxide at an operation temperature of -40°C .

The Choice fell on the system RAPID-COOL and pipe size DN 32.

The force-fit composite system of diffusion-tight jacket and polyurethane foam insulation facilitates the assembly of pipe supports on the outer jacket. Avoiding any thermal bridge and ice formation.

The major aspect while considering operation costs.



COMPANY DATA

Foundation:	1984, Troisdorf, Germany
Company legal status:	Incorporated company
Object of company:	Design and manufacture of pre-insulated pipes
Headquarter:	Brügger Strasse 6, 53842 Troisdorf, Germany
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