



METALS

HELPING TO SHAPE
THE FUTURE

ANDRITZ FBB GMBH

ANDRITZ

ENGINEERED SUCCESS



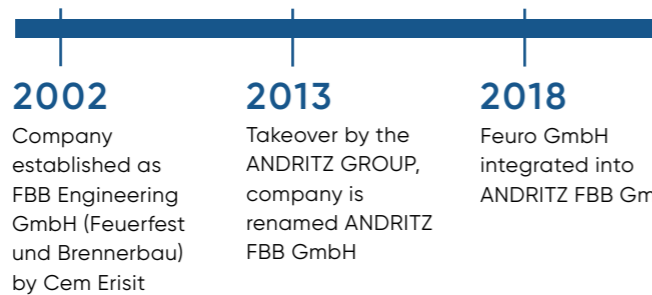
ANDRITZ FBB GMBH / Mönchengladbach,
Germany

WELCOME TO ANDRITZ FBB GMBH

Specialist for industrial burners, heating systems, refractory products, and insulating systems in the thermal process technology sector.

Since the company was established in 2002, ANDRITZ FBB GmbH has built more than 4,000 burner heating plants and burner models, and delivered more than 150 furnaces

with supporting tube insulation. ANDRITZ FBB has extensive technological know-how in the burner technology and refractory product sectors. Today, ANDRITZ FBB is one of the leading manufacturers of industrial burners, complete heating systems, refractory products, and insulating systems in the thermal process technology sector.



In-house production

ANDRITZ FBB provides engineering, manufacturing, installation, commissioning, and plant service for industrial customers all over the world. All from a single source.

OUR SERVICES:

- Engineering
- New equipment
- Retrofitting
- Modernization
- Spare parts
- Service

The bases of our customer service are high levels of reliability and quality, and brief response times.
"Put us to the test!"

FACTS & FIGURES:

Business segments:
Industrial burners
Refractory products
Refractory service

Year established: 2002

No. of employees: approx. 60

Production area:
1,370 m² (Mönchengladbach),
975 m² (Windeck)

Certification: ISO 9001, SCC**



FBB BURNERS IN OPERATION

Free-jet burners in an aluminum smelting furnace

Applications

Our target markets are, in particular, the steel and aluminum industries, the nonferrous metals industry, power plant engineering, and all branches of industry where combustion engineering is used.

Our products are mainly used in industrial thermal processing plants. Here we supply the refractory linings and supporting tube insulation for industrial furnaces as well as equipping them with firing systems, including air and fuel control lines. ANDRITZ FBB provides technical solutions for a wide spectrum of industrial furnaces and many other applications:

STEEL INDUSTRY

- Walking hearth/walking beam furnaces
- Pusher-type furnaces
- Rotary hearth/rotary table furnaces
- Roller hearth furnaces
- Car bottom furnaces
- Hood-type furnaces
- Chamber furnaces
- Annealing pit furnaces
- Pit furnaces
- Sintering plants
- Strip coating lines
- Ladle heaters

ALUMINUM INDUSTRY

- Smelting furnaces
- Pusher-type furnaces
- Walking beam furnaces
- Roller hearth furnaces
- Continuous chain furnaces
- Car bottom furnaces
- Chamber furnaces

OTHER APPLICATIONS

- Thermal post-combustion
- Chemical industry
- Powder metallurgy
- Hot-gas generators
- Dryers, roasters
- Steam production
- Environmental engineering

Products

Depending on your requirements, we deliver standardized or custom-tailored equipment. We have the right solution for your application.

REFRACTORY PRODUCTS

Our portfolio contains refractory materials, custom tailored for increased furnace productivity and highest energy efficiency, and precast refractory systems for skidpipe insulation in walking beam and pusher-type furnaces.

ANDRITZ FBB supplies customers all over the world with prefabricated, refractory components and functional refractory products from dense and light refractory castable for a multitude of industrial applications, particularly in the steel industry. Rising energy costs and ambitious goals to reduce CO₂ emissions present a constant challenge for all those involved in the high-temperature segment to optimize their processes. In addition to raw material and labor costs, the cost of meeting energy and environmental requirements are playing an increasingly important role. New technical solutions are needed in order to improve energy efficiency so that energy consumption and CO₂ emissions are lowered.

The refractory division at ANDRITZ FBB has worldwide experience and is well-known for its progressive thermal process technology, which serves established markets and is expanding into new markets. The division is also a leading supplier of prefabricated insulating shapes made of dense refractory castable and lightweight refractory castable for skid pipe systems in reheating furnaces (walking beam and pusher-type) in the steel industry.

A modular lining concept with precast shapes for insulating skid pipes yields a significant reduction in installation time – typically by approximately 75% compared to a comparable installation on site, thus reducing the duration of furnace downtime and increasing plant availability and productivity.

The precast refractory insulation shapes feature a thermally optimized, sandwich-type structure and thus result in a significant reduction in heat losses to the furnace cooling system. This leads to a rise in energy efficiency at minimized energy consumption and low

CO₂ emissions. By using special light-weight refractory castables instead of conventional dense refractory castables, it is possible to achieve further substantial reductions in heat loss to the cooling system from the skid pipe system.

Tests and CFD calculations show a potential of more than 60% reduction in heat losses when using high-insulation, lightweight refractory castable. Industrial applications with the new lightweight precast shapes system in walking beam and pusher-type furnaces substantiate the tests and calculations and have resulted in a reduction of 35% and more in heat losses compared to the dense refractory material installed previously. In most cases, the annual energy savings – and thus also cost savings – result in an amortization period of less than one year. Refractory, functional products like burner blocks, quarls, ceramic air nozzles, casting launders, etc. for a multitude of high-temperature applications complete the refractory product portfolio of ANDRITZ FBB.

By providing spare parts at short notice, we are able to keep equipment downtime to a minimum at our customers' plants.



Pre-fabricated insulating shapes mounted at a walking beam furnace



Direct-ignition impulse burners in low NO_x design

BURNER TECHNOLOGY

Lowest emissions, highest efficiency

With our technically mature products, we can provide you with highest efficiency at lowest emissions. Our portfolio covers burner types for a large number of applications. No matter whether you need cold or warm start burners, with or without air pre-heating, recuperative or regenerative – we can always offer you

the best solution for your requirements. And whether you need single or multi-burner systems or complete heating systems, we can provide them together with the peripheral units required, such as fuel and air control lines, with all the safety-relevant fittings according to DIN EN 746-2.

Overview of nitrogen oxide emissions from selected burner types:

Burner types	Performance range [kW]	Air pre-heating [°C]	NO _x emissions* [mg/m ³ n] referring to 3% dry O ₂
Flat-flame burners FFB(210) – warm start burners	200-1200	600	< 100
Free-jet burners ZF(210)	500-7500	600	< 100
High-speed burners KULN(210)	50-500	600	< 200
Regenerative flat-flame burners FFB(310)	200-600	1150	< 250
Regenerative free-jet burners ZF(310)	750-8500	1150	< 200

*The emissions stated are based on values measured in actual plants (not laboratory figures!)

Service

We see service as more than just an effective advertising slogan. Our services in all aspects of industrial furnace engineering offer you maximum efficiency. From planning and project consulting, delivery of new equipment, repairs, maintenance, and performance optimization at your industrial furnace plants to new design and retooling of all industrial furnaces.

We place a high value on intensive consulting in order to be able to develop a complete, custom-tailored offer for our customers. We are at your side as a competent partner – from the conceptual design right up to commissioning.

In many cases, a small retrofit or optimum burner setting can increase the plant capacity substantially or improve its integration into the operating sequence. We also make progress possible with modernized plants as well. Benefit from our team's experience in the new concept for your existing plant.

RELIABLE, COMPETENT, PROMPT, WORLDWIDE

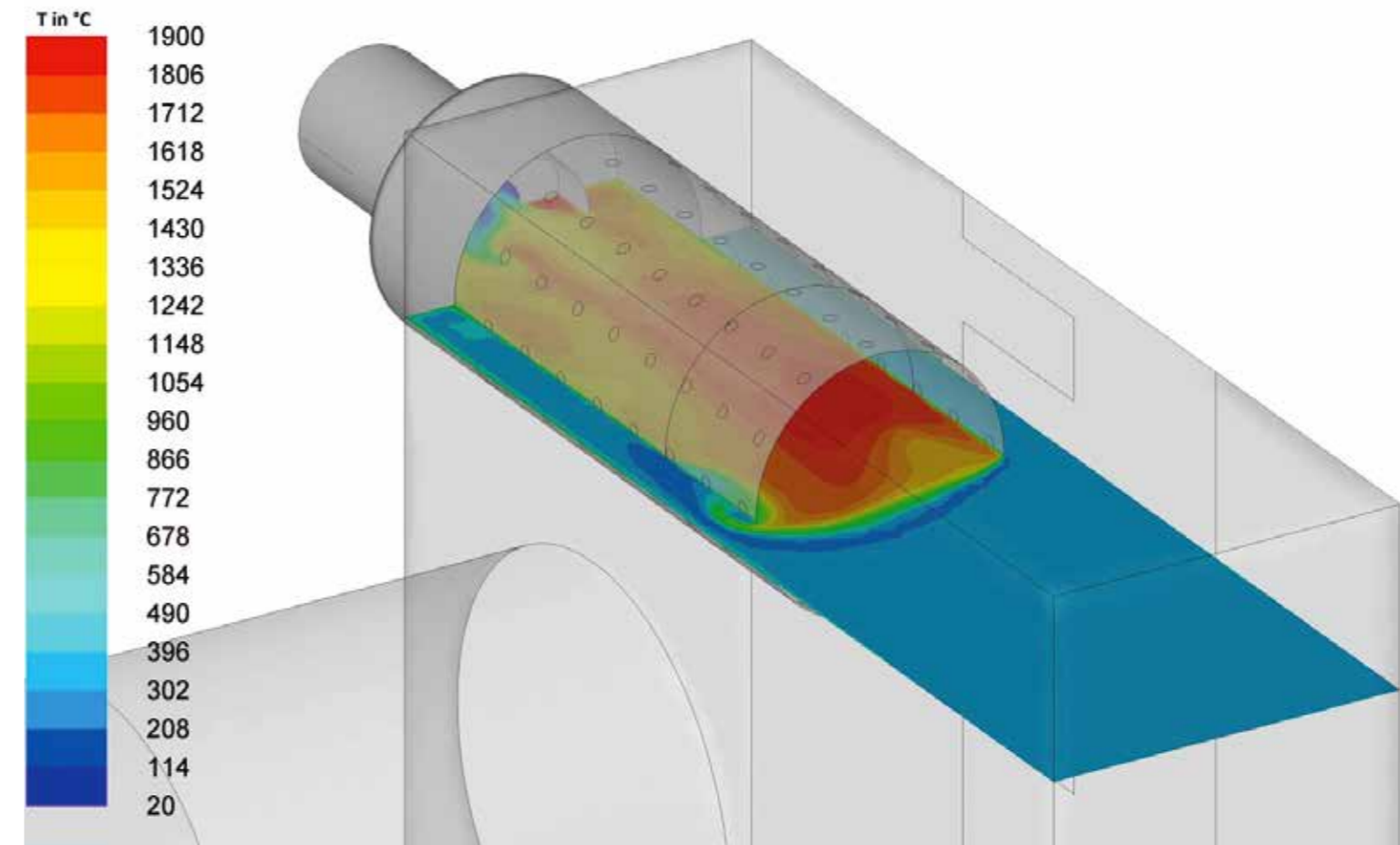
It is our goal to achieve a maximum of customer satisfaction. With our own service personnel, we can provide prompt response times and are at your disposal worldwide. Motivated, committed, competent.

Our service personnel has certification according to SCC Docs 016 and 017.

ANDRITZ FBB provides service work for the entire lifetime of your plant, also for non-OEMs.

SERVICE WORK

- Installation
- Supervision of installation work and coordination
- Commissioning
- Training
- Maintenance and optimization
- (Long-term) In-service measurements

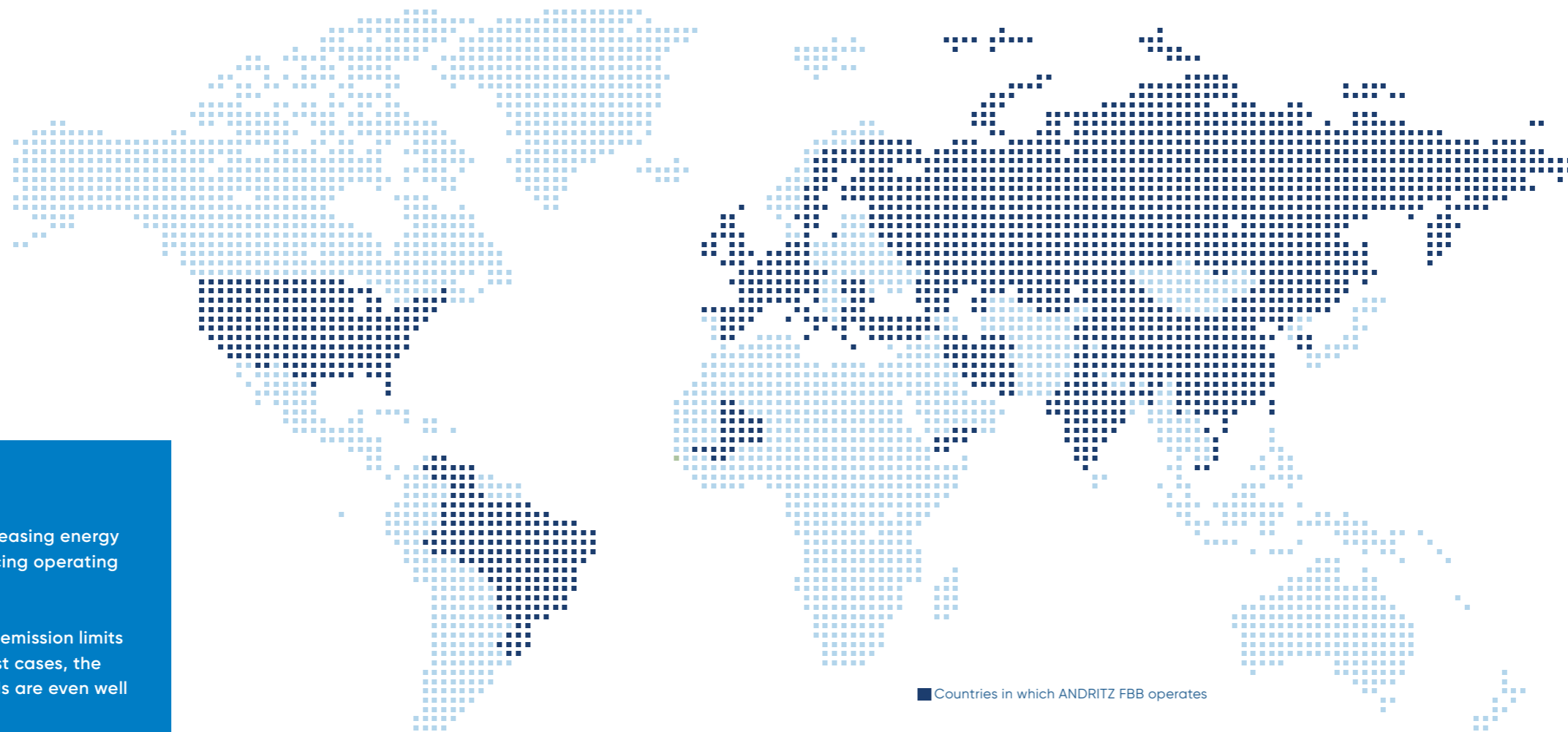


Computer-assisted flow simulation

Research & development

In addition to continuous further development of the existing products, ANDRITZ FBB is conducting research and development work on new burner and insulation systems based on practical experience in combination with the latest calculation methods, such as numerical flow simulation.

Improvements and forward-looking developments are guaranteed by taking part in international projects and collaboration with universities and research institutes. ANDRITZ FBB also operates its own, cutting-edge burner test stand and test furnace using the results of measuring campaigns to validate the products and computation methods. This constant further development and these innovations result in product improvements. And you as a customer benefit from this!



BENEFITS

- Cost savings by increasing energy efficiency and reducing operating costs
- Observing the legal emission limits (worldwide) – in most cases, the applicable standards are even well surpassed
- Access to products using the best available technology (BAT)
- Company's own service personnel provide excellent reliability, prompt reaction times, and high flexibility

Outlook: Thermo-processing technologies

What is certain is that the legal emissions limits will be tightened in the next amendment to the Technical Instructions on Air Quality Control (TA-Luft). This trend is visible worldwide and will continue in the next few years. For plant operators, this can mean there will be a need to modernize existing systems. They will have to check whether and to what extent modernization is necessary. The crucial factor is to begin planning such measures in good time. Another development with an impact on operation of ther-

moprocessing plants and which should not be underestimated is the change-over from low calorific value gas (L-gas) to high-calorific value gas (H-gas) in certain regions and the rising tendency in the future towards fluctuations in gas properties in the natural gas network due to increased infeed of gas produced in regenerative processes, such as biogas and hydrogen or liquefied natural gas (LNG) from overseas. Experience has shown that this has negative effects on the emissions from industrial burners. Operators of

industrial furnaces must check whether concrete measures must be implemented at their plants. This can affect the hardware components as well as the software side with increasing use of measuring equipment.

The main focus in developing the next generation of burners thus lies on the flexibility of the burners and their ability to adapt fluctuating gas properties as well as on the constant improvement of emissions behavior.

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- Saarstahl
- Primetals
- CMI
- Arcelor Mittal
- Georgsmarienhütte
- Deutsche Edelstahlwerke
- Industrie-Ofen-Bau GmbH



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