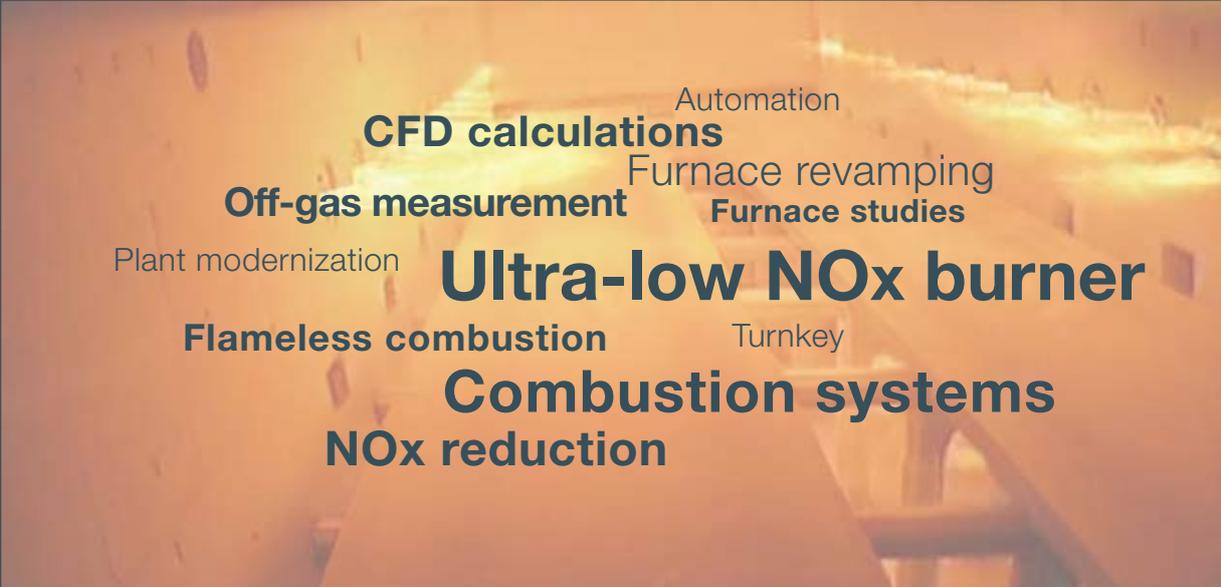


Industrial burners and combustion equipment





CFD calculations

Automation

Off-gas measurement

Furnace revamping

Furnace studies

Plant modernization

Ultra-low NOx burner

Flameless combustion

Turnkey

Combustion systems

NOx reduction

Modern burner systems for high-temperature applications

Striving for more economical operation – innovative technology helps to reduce energy consumption as well as emissions of CO₂ and NO_x

ANDRITZ FBB is a leading supplier of industrial burners, complete heating systems, and combustion equipment for a wide range of thermal industrial applications, particularly in the steel and aluminum industries, the forge industry, and for many other low- and high-temperature processes. ANDRITZ FBB has global experience in a wide range of thermal process industries and is best known for advanced thermal process technology serving established markets and expanding into new markets worldwide.

ANDRITZ FBB burners, heating, and combustion systems are designed and customized to increase furnace output and productivity and also optimize energy efficiency and product quality with minimized fuel consumption and lowest NO_x emissions by using cold-air and hot-air burners, regenerative burners, and flameless combustion. Continuous in-house development and improvement of our products, engineering,

and manufacturing together with extensive knowledge and application experience enable us to provide the best possible customized solutions.

The product range extends from cold-air and hot-air burners to regenerative burner systems and flameless combustion, operating with nearly all fuels. Adapted to the different areas of application, side-firing, roof-firing, and radiant tube burners are available with ceramic or metal air/gas nozzles. Pilot burners can be provided for all burner types.

ANDRITZ FBB's product and project planning success has always rested on the commitment to find solutions for different operating conditions and maintaining direct contact to its customers, regardless of whether it is acting as supplier or as general contractor. Our in-house development, furnace and process studies, construction, and burner test facilities enable tailor-made solutions that are oriented towards and op-

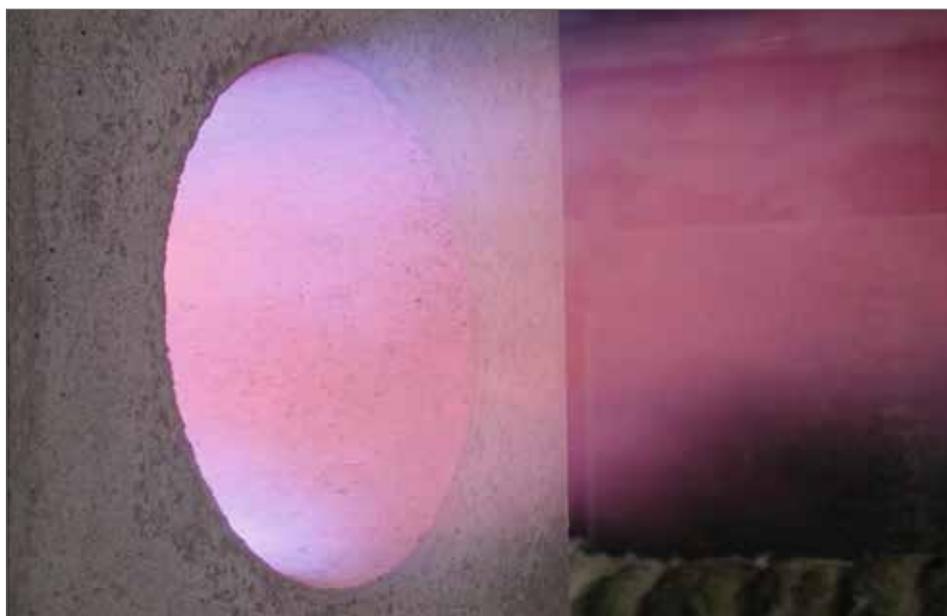
timized for customers' specific needs and requirements. Excellent support on site for installation and worldwide service as well as start-up, training, maintenance, and inspection complete the total package from ANDRITZ FBB.

Reduce operating costs and strengthen your market position

When talking about reducing emissions to conform to the most stringent legal requirements, a vast number of innovative technologies are available. Our burners and heating systems are characterized by high energy efficiency and low NO_x emissions, which are already far below the limits stipulated by national and international authorities. Consequently, plant manufacturers can benefit from reduced operating costs and hence strengthen their market position towards competitors.

Types of burner

- Ignition burner
- Radiation burner
- Flat flame burner
- Impulse burner
- Radiation tube burner
- Ultra-low NO_x burner
- Flameless burner
- Regenerative burner
- Oxygen burner
- Sinter burner
- Customized burner



▲ Flame shape

Advanced thermal process technology for high-temperature applications

Cost-effective and efficient NO_x reduction – zero flame combustion

High-efficiency combustion

Nitrogen oxides (thermal NO_x) are formed during nearly every combustion process. The intensity of thermal NO_x formation depends on flame and furnace temperature, local oxygen partial pressure, concentration of nitrogen, residence time of gases at high temperature, air pre-heating, and many more operating conditions.

Increasing furnace temperature and air pre-heating leads to an increase in flame temperature, and higher NO_x formation. In-depth knowledge of NO_x formation in combustion processes is essential if selective measures for NO_x reduction are to be successful.

Low NO_x and ultra-low NO_x burners from the Tri X100 and Tri ZF100 (zero flame combustion) series operate with an optimized mixture of fuel, combustion air, and high recirculation of flue gas. Oxygen is limited in the primary combustion area, so the adiabatic flame temperature will not be reached and a significant reduction is achieved in NO_x formation. Full combustion of the fuel is achieved by adding secondary air and takes place in a large-volume area almost without any visible flame (flameless combustion).

Regenerative burner systems

Due to rising energy costs and the need for energy efficiency, reduction of NO_x formation and of CO₂ emissions, regenerative combustion is becoming increasingly popular. Preheating the combustion air is a highly effective way to increase the efficiency and productivity of industrial fur-

naces. Regenerative combustion systems use pairs of burners working together. When one regenerative burner is firing with preheated combustion air, the other one applies suction to remove the furnace off-gases that preheat the corresponding regenerator. The energy from flue products is recovered and stored. When the regen-

erator is fully heated, the burners switch round. The regenerative burner currently firing is turned off and starts to remove the flue products by suction, while the second one starts firing. Combustion air passes through the regenerator and is heated to temperatures close to the furnace/process temperature.

Burner type	Emission values
Tri X100 – low NO _x burner	NO _x emission: <125 ppm/m _N ³
Tri ZF100 – ultra-low NO _x burner Flameless burner (zero flame)	NO _x emission: <50 ppm/m _N ³



▲ Aluminum melting furnace



▲ Roof burner of a sinter plant ignition furnace

Intelligent refractory products to increase furnace productivity

Pre-fabricated insulating shells with thermally optimized design

Designed to reduce installation and down-time

ANDRITZ FBB serves customers worldwide with pre-fabricated components and functional refractory products made of dense and light-weight refractory castables. ANDRITZ FBB's refractory division is the leading supplier of pre-fabricated insulating shells made of refractory castables for

skid pipe systems in reheating furnaces (walking beam furnaces, and pusher-type furnaces). A modular lining concept using pre-fabricated parts with a thermotechnical optimized sandwich design provides easy, fast and cost-saving installation as well as reducing the downtime of the furnaces during maintenance, thus increasing their productivity. Excellent onsite support

for installation and worldwide service, as well as start-up, training, maintenance, and inspection complete the product portfolio of ANDRITZ FBB.

Functional refractory products for a wide range of high-temperature applications, e.g. in the aluminum industry, complete the refractory product program of ANDRITZ FBB.

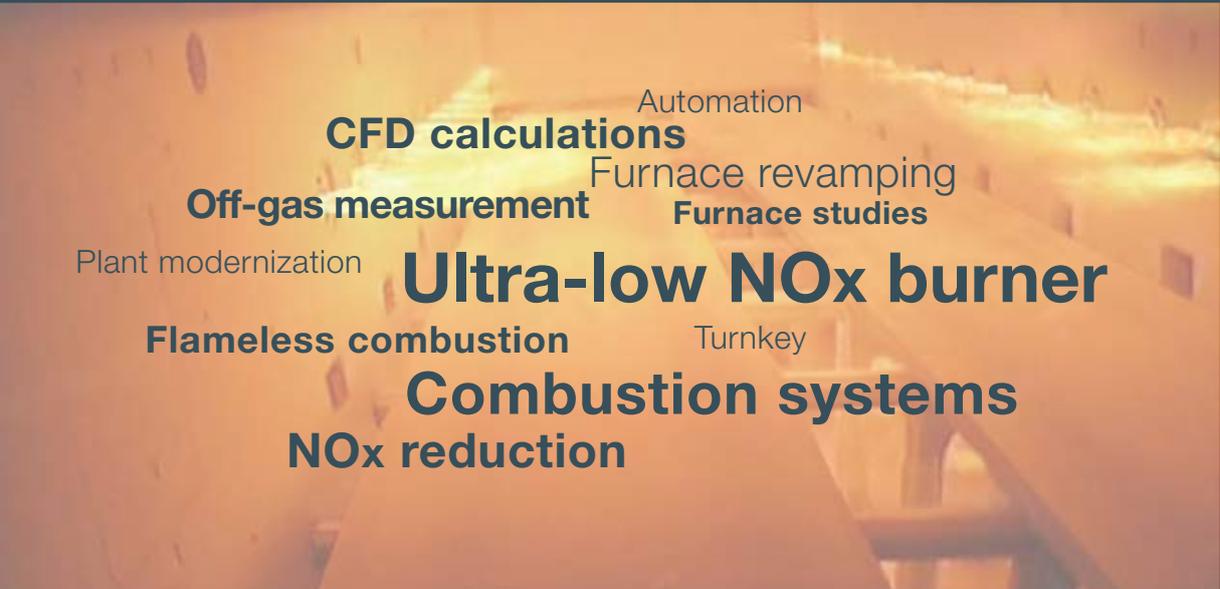


▲ Pre-fabricated insulating shells for skid pipe system (WBF)

Extract from our reference list

Numerous customers worldwide value our experience and rely on our product quality.

Aluminum industry	Steel industry	
Alcomet PLC, Bulgaria	Acroni, Slovenia	Marienhütte, Austria
Aluminium Norf, Germany	Ak-Demir, Turkey	NLMK, Russia
AMAG, Austria	Angang Steel, P. R. China	Nilfer, Turkey
CMS, Turkey	ArcelorMittal Group, Belgium, France, Germany, Luxembourg	Oksan, Turkey
ETI Aluminium, Turkey	Beijing Grandyound, P. R. China	Outokumpo, Sweden
Georg Fischer, Austria	Benteler Paderborn/Dinslaken, Germany	Özkan, Turkey
Hydro Aluminium, Germany	Bosio, Slovenia	Saarschmiede, Germany
Kumz AL, Russia	BSW, Germany	Salzgitter, Germany
Neuman Aluminium, Austria	Buderus Edelstahl, Germany	Siemens VAI, Austria
SMS Hertwich, Austria	CVS, Turkey	Swiss Steel, Switzerland
Trimet AG, Germany	Demirsan Haddecelik, Turkey	TATA Steel Ijmuiden, Netherlands
	EGE Celik, Turkey	TKS Group, Germany, Brazil
	ETI Bakir, Turkey	Tosyali, Turkey
	Hoesch Hohenlimburg, Germany	TSTG, Germany
	Industeel S.A., Belgium	V&M Group, Germany, France
	IOB, Germany	voestalpine, Austria
	Küttner, Germany	Yazici Demir Celik, Turkey
	LOI, Germany	



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