



THE SIGN OF RESPONSIBLE ENERGY USE.



WE DEAL IN ENERGY, EFFICIENCY, COMMITMENT, AND RESPONSIBILITY.

The energy requirements of our modern society are constantly increasing. At the same time, we find ourselves faced with challenging environmental issues. As one of the world's leading companies, with more than 80 years' involvement in combustion technology, we are well aware of our responsibilities. As a result, corporate responsibility

is an established element of our thinking and we are determined to make a genuine contribution to covering global energy requirements with solutions that are not only cost-effective but also energy-efficient and therefore beneficial to the environment. Our main focus is on conserving resources by utilizing waste and special fuels for energy. On the other hand, we apply our knowledge and experience to making combustion of conventional fuels as efficient as possible, thus reducing CO₂ emissions. We also provide efficiency analyses and plant modernization, to upgrade existing plant to meet the most stringent environmental standards and to take advantage of untapped energy.





Global and approachable.



With more than 1,000 employees worldwide and our global network of production sites, branches and partners, we are represented on every continent and have a presence wherever our customers need us. Although we are truly international, we have maintained a healthy approachability. We remain a medium-sized family-run company that is marked by clear structures, short decision-making paths, solid financial management, continuity and reliability in management. At our headquarters in Bremen, which is also the base for our research and development activities, we make sure that our customers worldwide have access to engineering know-how "made by SAACKE". However, we also have our own production sites in key markets.

On land and on water.

As a specialist in burners and system solutions for thermal industrial processes, our products and services have a strong presence in industry both on land and in shipping and



offshore plants. With our Marine Systems, Industrial Solutions / Thermal Process Technology and Service divisions, we cover the entire spectrum of burners and combustion

plants. On land and on water, we make our contribution to ensuring that our customers can make effective use of their previously untapped thermal potential, while protecting the environment and ultimately increasing their cost effectiveness.

Development and success.

We tackle the challenges of constant progress, research and develop future-oriented products and systems that always represent the state of the art. This means research and development are enormously important to us. We dedicate



a lot of time, effort and financial resources to developing new methods and improving existing ones. To maintain our high standards, we operate a development center at our corporate headquarters in Bremen, which contains a range of combustion plants that are designed in such a way that their performance can easily be converted to an industrial scale. Our pilot plant with five boilers for product development, fuel analysis and training is the basis for advanced combustion technology all over the world.

WE WORK TO ASSURE THE FUTURE OF OUR CUSTOMERS AND OUR ENVIRONMENT.

↳ Burners and range.

It all began with oil and gas burners. We made a name for ourselves internationally by developing and producing them, and continuously extended our expertise over the years. Our oil, gas and multi-fuel burners, as well as our extensive Low NO_x range, are still setting standards worldwide today.

↳ Standard fuels and alternatives.

For the foreseeable future, gas and fuel oil will remain indispensable energy sources and we will continue to supply and develop efficient burners in this area in the future. However, in view of the rising costs and environmental requirements, it is just as essential to increasingly replace conventional fuels with alternative fuels as far as possible.

We have developed various burner technologies that guarantee combustion of alternative fuels with low harmful emissions. This turns low-heat-value by-products or waste materials from industrial processes into valuable sources of energy.

Here are a few examples:

For combustion of gaseous fuels with low heat values, we developed the SSB swirl burner series and also supply several burner types for use with biogas. Our SKV series of rotary-cup atomizer burners allow a wide range of liquid by-products to be used. Likewise, we supply burners that enable powdered industrial by-products to be used for energy.

↳ Combustion and improvement.

Part of our vision is that our products should meet the most stringent environmental standards and, in many cases, exceed them. As a result, we have developed technologies that combine reduced emissions with improved performance.

The two-stage combustion process we developed is not only a method of reducing NO_x emissions, but is also a primary measure by which combustion is managed in such a way that nitrous gases cannot form at all.

Know-how and quality.

We do not limit ourselves to burner technology. In fact, we have always been interested in developing burner and boiler systems. This is particularly true in the marine sector, where it has proven effective to supply burners and boilers as a single unit. We have developed from a product and system supplier into a plant manufacturer. Whether customers want a turnkey plant, individual assemblies or plant components, we supply everything from a single source.

Our expertise covers everything from basic engineering and validation of the process engineering to system control as well as assembly and piping planning right through to

installation and commissioning. And we really take basic engineering literally: we make use of our proven test plants as well as state-of-the-art CFD simulations. At the same time we cooperate closely with universities and research institutions. In short, we do everything we can to guarantee that our products and plants function safely, efficiently and cost-effectively. For us it is a matter of course that our products and systems meet the most stringent international quality requirements and regional standards. In many cases we even surpass these standards.

More than 100,000 industrial combustion plants and more than 6,000 marine plants worldwide clearly demonstrate our commitment to supplying top-quality engineering and maximum technical reliability.

Example developments.

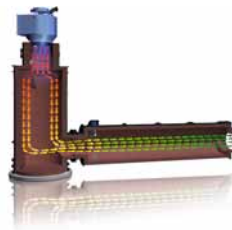
1934:
Launch of SAACKE rotary-cup atomizer technology



1979 – 1987:
Launches of SKV monoblock rotary-cup atomizer series, external flue gas recirculation to reduce nitrogen oxides, SAACKE DDZ steam pressure atomizer burners, gas turbine flue gas burners based on DDZ technology



1992:
Launch of 2-stage combustion technology



1999:
SAACKE becomes a system supplier for entire marine boiler systems



2004:
Commissioning of first furnace gas combustion plant



2004:
Launch of gas combustion unit (GCU)



2008:
Commissioning of the first combustion plant for low-heat-value liquid fuels: molasses incineration in Brazil



2011:
Launch of se@vis efficiency monitor



WE PROVIDE OPTIMUM SOLUTIONS FOR INDUSTRY.

Expert and reliable.

No matter what special fuel or specific application, our engineers will find the perfect solution. The same applies to our consultancy services when it comes to modifying existing plants.

We offer you comprehensive consultancy and expert engineering to make your combustion plants cleaner and more efficient. Excellent durability and a long service life are the key features of our products. This benefits our customers in terms of low maintenance, repair and servicing costs. And of course the environment benefits at the same time.

Standardized and individual.

Energy efficiency, safety and environmental friendliness are the properties that characterize all of our plants. Our range includes burners for various industries, fuels and applications as well as complete hot-gas generators and combustion chambers. In addition to this we supply the associated process measuring and control technology. We offer a wide range of products, from 1 to 100 MW (individual capacity).

Depending on requirements, we supply either standard components or customized solutions, tailored to our customers' exact demands and requirements, for conventional fuels or more than 50 alternative fuels. For all applications, we consider not only individual burners, but always focus on the entire plant. What our customers get from us – and what they particularly value – is our extensive experience and the expert knowledge we apply for their benefit in every single project.

Facts

- Turnkey plants
- Flame tube boilers, thermal oil heaters, water tube boilers, hot-gas generators, combustion chambers
- Process measuring and control technology
- Burners from 1 to 100 MW
- Customized solutions for every special fuel and any specific application



WE CAN HANDLE TOUGH CHALLENGES.



- Best available technology and tailored turnkey solution
- Substitution of 800m³/h of natural gas with low-heat-value vents
- Safe and reliable combustion of zone 0 gas without support fuel
- Highly efficient combustion technology with fuel gradation for the lowest emissions
- Convenient to operate, maximum availability and longest service life
- Back-up thermal oil system ensures wide control range

The port of Rotterdam, in the Netherlands, where “Odfjell Terminals” operate a large fuel depot. The chemicals arrive by ship from all over the world and are stored and handled. Within the tanks, so-called vents form – explosive outlet air that the company wanted to use thermally for distillation. However, at that point, there were no technical solutions available that allowed combustion of gases which such a low and fluctuating heat value. We met this challenge head-on and developed a system that allows reliable combustion of these gases. With a turnkey plant that included a modified SSB swirl burner for low-heat-value gases and a custom-developed measuring and control system, we were able to meet the customer’s requirements. At the terminal, up to

80% of the capacity of the thermal oil boiler is provided by the vents, saving around 800m³/h of natural gas and the disposal costs for the vents.

WE ARE TOTALLY SEAWORTHY.

↳ Wind and weather.

SAACKE burners and firing systems have been used worldwide on ships of all nationalities for more than 75 years. We develop, produce and assemble reliable and energy-efficient heat generation plants for seagoing vessels, offshore plants and LNG carriers. Our product range includes standard plants as well as customized plants incorporating systems tailored to customers' needs and preferences.

The key to this successful use of our products is their absolute reliability on the high seas, in any weather and any sea conditions, from the tropics to the Arctic. As always, efficient protection of our environment is important to us, and we do not neglect our obligations on the world's oceans.

↳ Experience and development.

Based on our marine boiler know-how and our experience in industrial combustion technology, we are able to develop and produce exceptionally-low-emission plants for the marine sector. An outstanding example of the successful pooling of our marine and land experience is the FMB-VF-LONOX fired marine boiler. This is a low-NOx boiler that we designed both to cope with the limited space available on ships and to comply with the stringent emissions standards in ports. This pioneering work in redefining the burner/boiler compatibility of our plants has increased economic efficiency while simultaneously maintaining strict compliance with current and future environmental regulations.

We also offer a wealth of experience and expert knowledge, which we apply for the benefit of our customers, in the development and production of new plants and by advising on modifications to existing plants.

Facts

- **Highest standards in maritime combustion technology**
- **Heat generation plants for seagoing vessels, offshore applications and LNG carriers**
- **Gas Combustion Unit (GCU)**
- **Composite Marine Boiler (CMB)**
- **Fired Marine Water Heater (FMW)**
- **Fired Marine Boiler (FMB)**
- **Exhaust Gas Marine Boiler (EMB/EME)**



ALL ABOARD FOR ENVIRONMENTAL PROTECTION.

At the STX shipyard in Turku, Finland, visions become reality. This is where the new passenger ferry "M/S Viking Grace" is being built by order of the historic Finnish shipping company Viking Line. The 214m ship combines the ultimate in passenger comfort with environmentally friendly design features. Its dual-fuel engine, which runs on heavy oil (HFO), marine diesel (MDO), marine gas oil (MGO) and above all liquefied natural gas (LNG), is unique for a ship of this size. The result is a drastic reduction in nitrogen oxide and CO₂ emissions.



M/S Viking Grace is the first ferry with dual fuel propulsion.

SAACKE has supplied two boiler systems, each of them features an SKVG 50 burner and four flue gas boilers. Environmental protection, as always, is a key element. SAACKE responds to this challenge with ecologically sound solutions. The burners are operated with heavy oil, marine gas oil and also with gas. These are the world's first gas burners on a modern passenger ship of these dimensions.

SAACKE has been producing its own ship boilers as a system supplier since 1999. For this special application on ships, they need to be able to meet exceptionally demanding requirements. Not just in terms of extreme acceleration forces and sharp temperature and pressure fluctuations, but also when it comes to saving space on board and a host of other technical details.

- The world's first gas burner on a passenger ship of this size
- Two SAACKE auxiliary boilers with SAACKE SKVG 50 burners and four flue gas boilers
- Operational reliability and efficiency thanks to SAACKE rotary-cup atomizer technology
- Future-proof thanks to compliance with existing and planned emissions regulations
- Independent of price developments of individual fuels due to alternative operation with heavy fuel oil, marine gas oil and gas



SAACKE's SKVG series combines all advantages of economical, reliable and environmentally friendly combustion.

WE ARE THERE WHEN YOU NEED US.



and logistics capacities, we ensure fault-free operation of combustion plants even after installation and commissioning on site.

In everything we do, we always consider the overall plant, so that we can identify the optimum solutions. Worldwide and around the clock. At any time, our customers can choose the exact part they require for their specific needs from our range of services.

What's more, as our plants are notable for their exceptionally long service life, our spare parts remain available for decades.

↳ Efficient and environmentally friendly.

We are at home throughout the world. Our service employees support our customers on every continent with their know-how and dedication. Needless to say, our customers' needs and requirements are at the center of everything. But our advice also benefits the environment. We not only offer energy-efficient products and advice in planning new, environmentally friendly plants, our efficiency analyses also contribute to optimizing the efficiency and ecological impact of existing combustion plants.

↳ Flexible and reliable.

Just like our burner systems, our service is flexible, expert, innovative and of the highest quality. We offer support with everything from advice on plants to product selection and production, through to deliveries and additional services. Service callouts, repairs and genuine spare parts are also part of the practical assistance we offer our customers. Backed by extensive maintenance, repair

Facts

- **Worldwide Marine Service Network**
- **Assembly**
- **Commissioning**
- **Maintenance service**
- **24-hour hotline**
- **Plant advice on energy efficiency, modernization, upgrade**
- **Training in Bremen and at customer location**

WE ARE AS INTERNATIONAL AS OUR CUSTOMERS.



↘ Global and local.

With service stations in more than 20 countries around the world, more than 70 international agents and a large number of service centers, such as in all major ports, we can be found wherever our customers need us.

↘ Germany

- Head Office in Bremen
- Development & burner production in Bremen
- Sales and service locations for industrial combustion systems and marine systems

↘ Europe

- SAACKE Benelux
- SAACKE Finland
- SAACKE France
- SAACKE Austria
- SAACKE Poland
- SAACKE Romania
- SAACKE Russia
- SAACKE Switzerland
- SAACKE Serbia
- SAACKE Spain
- SAACKE Turkey
- SAACKE UK
- Marine boiler production in Zagreb, Croatia

↘ Asia

- SAACKE China
- SAACKE India
- SAACKE Korea
- SAACKE Malaysia
- SAACKE Vietnam
- Marine boiler production in Qingdao, China

↘ America

- SAACKE Argentina
- SAACKE Brazil
- SAACKE North America/USA

↘ Australia

- SAACKE Australia

↘ Africa, Middle East

- SAACKE Bahrain
- SAACKE Iraq
- SAACKE South Africa



The logo for SAACKE, featuring the word "SAACKE" in a bold, blue, sans-serif font, enclosed within a white rounded rectangle with a blue border.

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