



# Power Generation Industry

Enhancing your Power Plant's  
Reliability and Flexibility



GERMAN MANUFACTURING • ROBUST SOLUTIONS • BEST-IN-CLASS PRODUCTS

# Meeting the needs of today's power generation industry

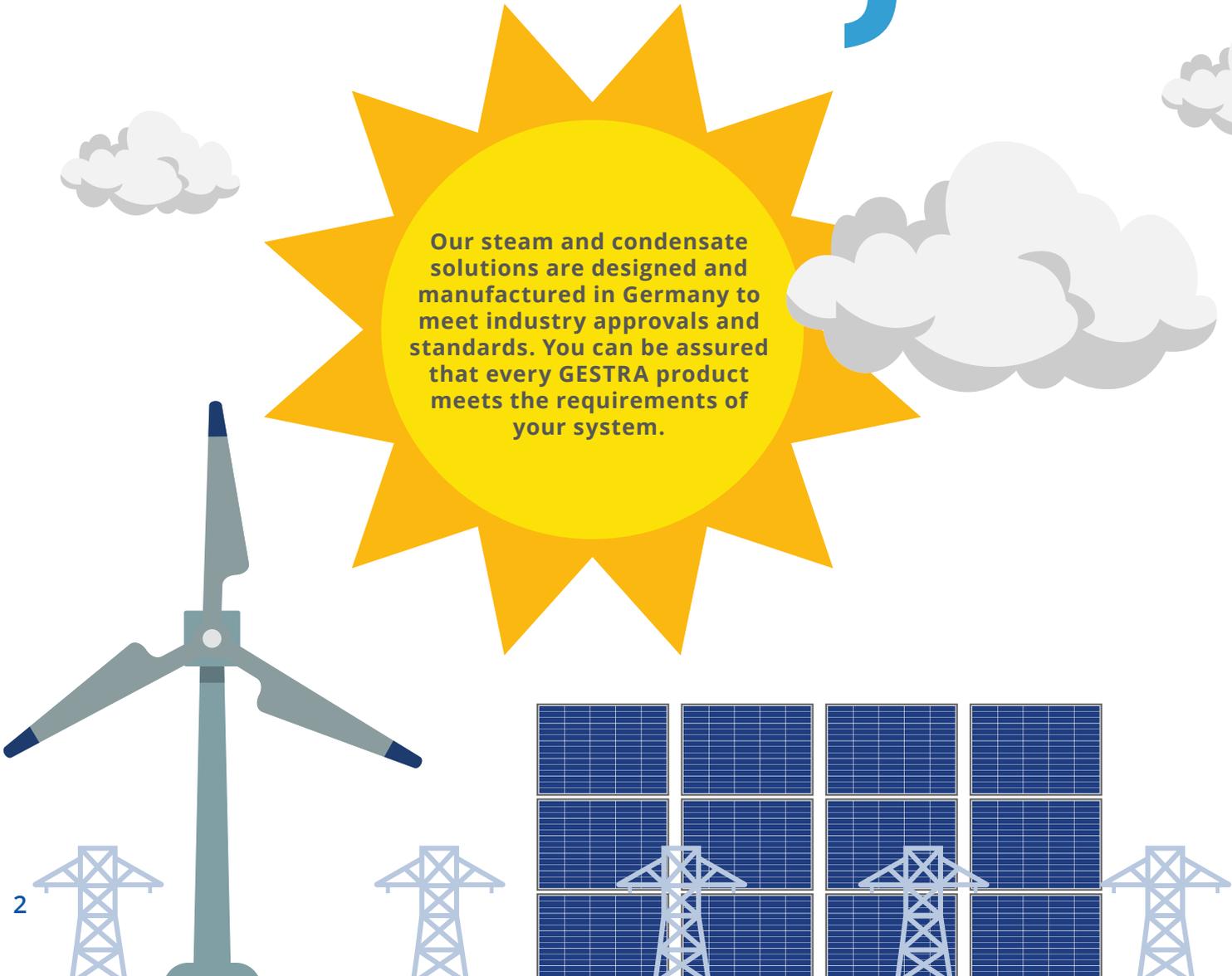
The growth in renewable energy has changed the way fossil fuel power plants operate. Plants are increasingly required to adapt to fluctuating demand, which means they **start up** and **shut down** more **frequently**.

Operating over shorter periods of time, running at minimum load and rapidly changing generation output are also realities of the power plant industry.

These activities all put **huge stress** on plant equipment, leading to a higher likelihood of **equipment failure**.

GESTRA solutions are precision engineered with longevity and productivity in mind. With more than 100 years of experience in steam solutions, we combine industry expertise with German design principles to offer hard-working products based on decades of experience in providing flexible and dependable steam solutions.

## 100+ YEARS OF SOLUTIONS FOR STEAM AND WATER APPLICATIONS



Our steam and condensate solutions are designed and manufactured in Germany to meet industry approvals and standards. You can be assured that every GESTRA product meets the requirements of your system.

# Expert solutions to help you achieve your goals

Our products are engineered to be dependable and meet your needs. GESTRA has been trouble-shooting severe service applications in the steam and water cycles for more than five decades. Our solutions deliver the flexibility and reliability your plant requires, now and in the future.

## Flexibility – for frequent and fast start ups

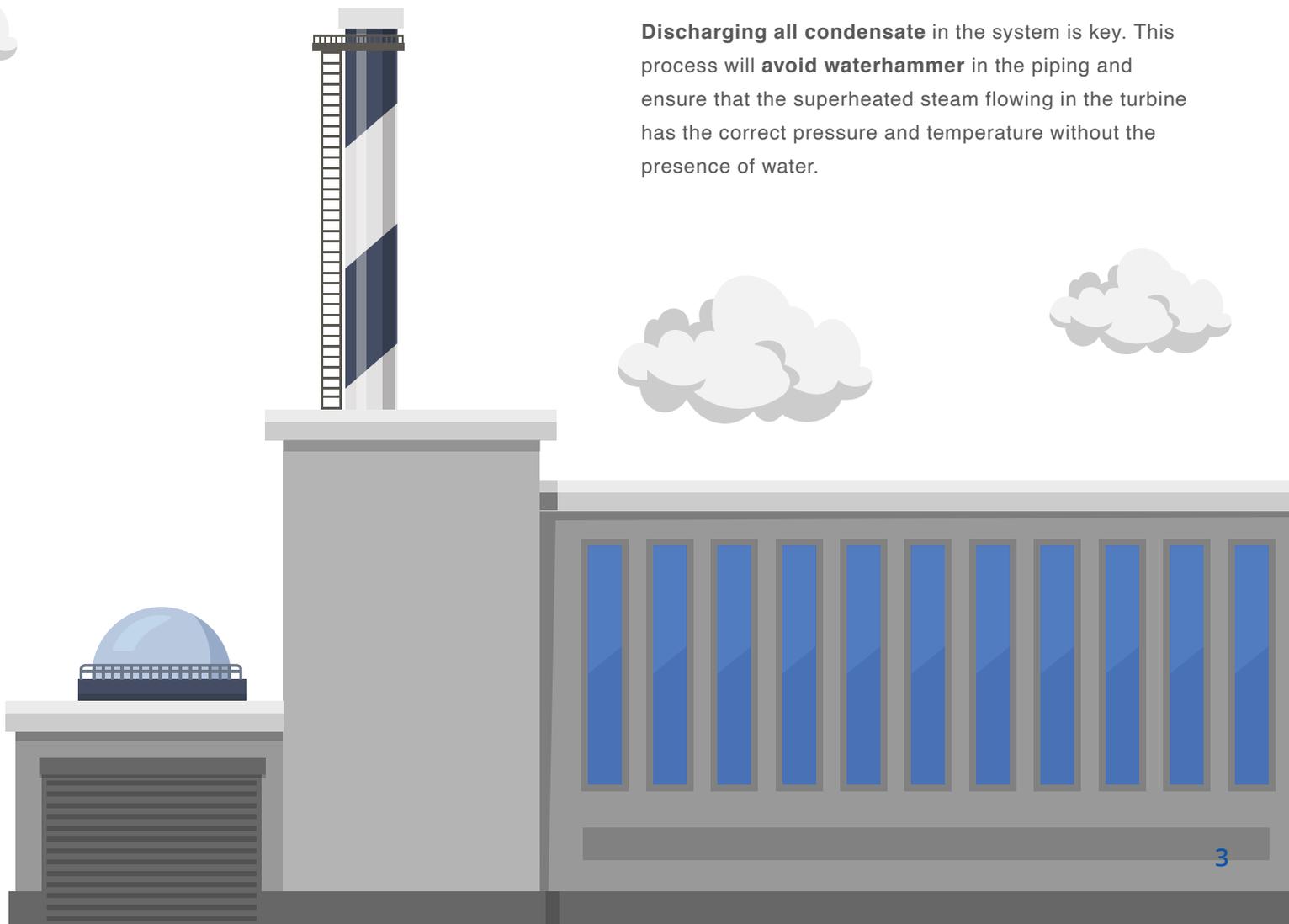
Power plants increasingly need to respond to fluctuating demand so the ability to start up quickly and often is vital. A significant benefit for any plant is the ability to **reduce thermal dispersion** so it's essential to **avoid leakage** from the steam and water cycles.

## What happens during the start-up process?

At start up, the boiler's drain valves are kept open until a specific superheated steam temperature is reached; at this point they will start to progressively close (known as inching service). The turbine drains are kept open until a specific turbine load is reached (a temperature control may be also used).

After start-up, all drain valves are kept closed and must be **zero-leakage tight**.

**Discharging all condensate** in the system is key. This process will **avoid waterhammer** in the piping and ensure that the superheated steam flowing in the turbine has the correct pressure and temperature without the presence of water.



### How can you avoid leakage from the steam and water cycles?

- Use **metal to metal zero leakage tight shut off** actuated drain valves
- Install **energy efficient steam traps**
- Implement a **proactive steam trap maintenance** plan to avoid controllable steam loss

GESTRA can support you in a complete review of your draining system. The result is faster start-up times and energy savings.

### Why is a metal to metal zero leakage tight shut off valve crucial?

Drain valves handle a **biphasic mixture** of water and steam at **high differential pressure** (up to 200 bar and above). The boiler and the line drain valves discharge into the atmospheric start-up flash vessel, while the turbine drain valves discharge into the condenser. The high differential pressure creates a large amount of flash steam at **high velocity** as well as **water droplets**; this leads to **severe erosion**.



**Zero leakage tight shut off drain valves help in the speeding up of start-up times, reduce the need for maintenance, save replenishment water costs and improve plant efficiency.**



### Reliability – to withstand severe service applications

High-pressure applications require **safe, robust** products that perform well and endure. The combination of high differential pressure and high-velocity biphasic mixture of water and steam puts considerable stress on a system's drain valves.

Even 30 bar g is more than enough to kickstart the internal erosion process in a standard drain valve. Once erosion has commenced, it will continue until replacement of the trim components – or, most likely, the complete valve – is required.

Replacing valves frequently in your system is **time consuming** and **costly** as it requires a number of activities. These include cutting, re-welding, heat treating, NDE testing and commissioning.

GESTRA's wear-resistant severe service ZK valves are designed and manufactured in Germany to meet global safety standards. The result is in an exceptional product that withstands stress and cuts down on maintenance.



THE ANSWER IS  
SIMPLE: STOP  
REPLACING  
STANDARD  
VALVES WITH  
SIMILAR ONES



## Why do standard valves fail more often in drainage applications?

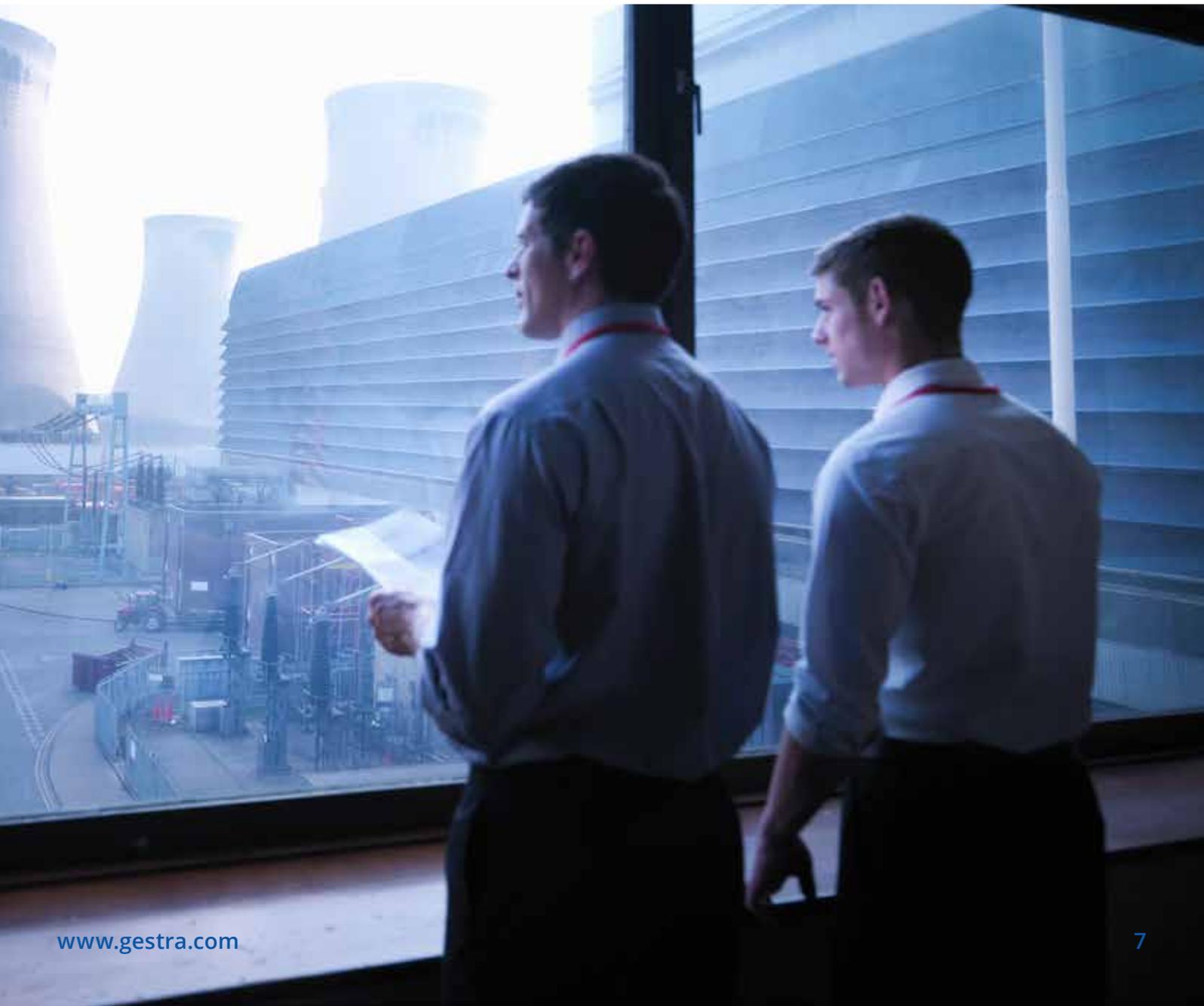
Standard isolation valves are not designed for drainage applications. The way today's power plants operate further highlights their ineffectiveness in the environment. Created for on-off applications, they cannot handle any differential pressure.

Correct valve sizing is crucial. Standard valves cannot be sized for a plant's operating conditions so the flow coefficient (Kv or Cv) is often too large. As a result, they are often operated at a lower percentage of opening which means they quickly deteriorate.

Use of the right metallurgy is also a key factor. Stellite coatings, often found on standard valves trims, cannot withstand the erosion caused by high-velocity biphasic fluids.

## How can I avoid costly and time-consuming valve maintenance?

The answer is simple: stop replacing standard valves with similar ones. Standard isolation valves (ball or globe design) are unable to handle differential pressure which creates high velocity. This is extremely damaging not only to the trim parts of the valve, but to the entire drain piping system.



## ZK valves

How are GESTRA ZK valves designed to meet the needs of today's power plants?



The GESTRA ZK valve employs a combined isolation and control valve design, capable of granting a metal to metal zero leakage tight shut off.

## More reasons to choose GESTRA solutions

- **Ease of maintenance**

Unlike many standard valves that have a welded bonnet, the GESTRA valves are **in line repairable**. Our valves and steam traps have a **quick-change trim** design which means it takes less time to ensure your system runs optimally.

- **Optimise performance**

Products designed to the highest quality ensure your system always runs at its best.

- **Save energy**

Zero leakage tight shut off valves cut down on water make-up and treatment costs, leading to lower fuel and water usage and a better CO<sub>2</sub> footprint.

## Steam traps

Steam traps also play an important role in the drainage process too.

- Installed in parallel with the turbine's drain valves, steam traps prevent condensate backing up
- In the boiler and the steam lines, steam traps discharge any condensate that builds up during plant operation
- Steam traps are continually called upon to discharge condensate during normal operation and **prevent waterhammer** in the piping.

## BK thermostatic steam traps



- › No steam losses
- › Energy efficient
- › High reliability

‘ MORE THAN FIVE DECADES OF TROUBLESHOOTING SEVERE SERVICE APPLICATIONS IN THE STEAM AND WATER CYCLES ’



Regular steam trap surveys are essential to ensure the steam trap population is running at optimum productivity.

# GESTRA has over 100 years of experience in the steam business

## We put ourselves in your position

We see ourselves as **problem solvers** who listen to you and take your perspective. Our qualified and experienced engineers will work with you to define your goals at the beginning of each project so that our services and product offerings are tailored and integrated to suit your requirements.

## Global coverage with support

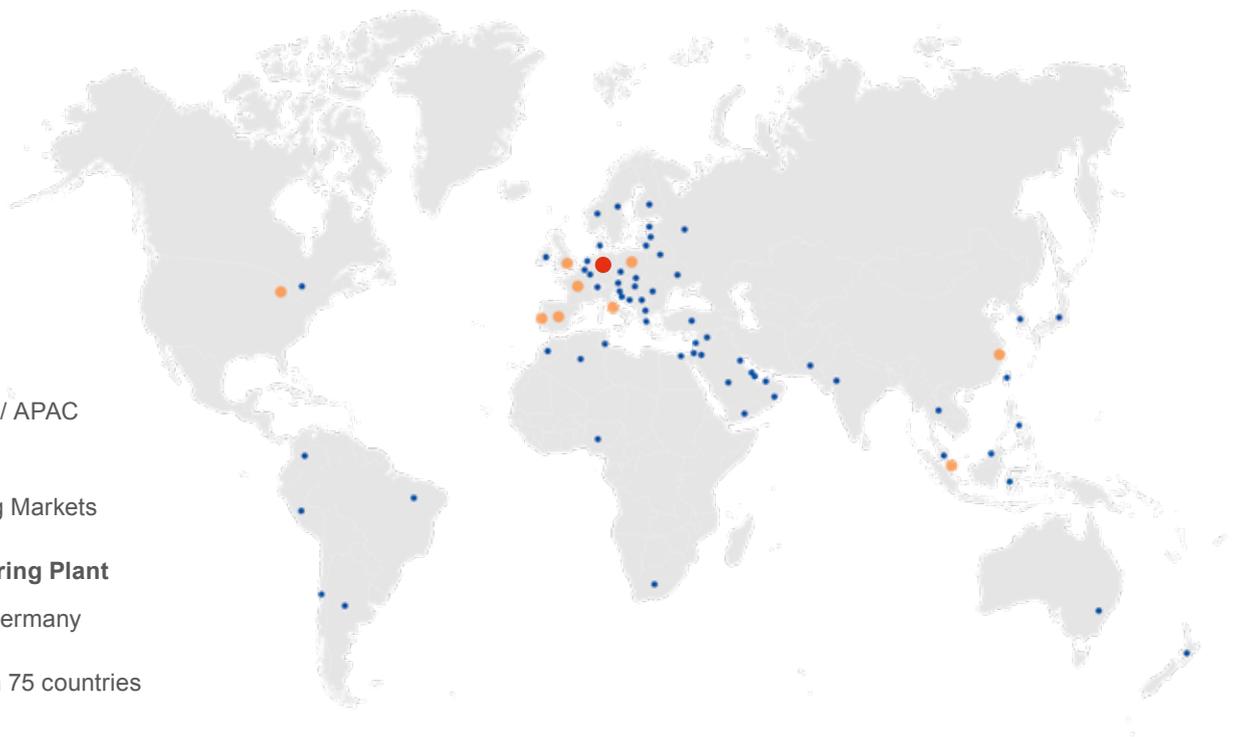
### 11 direct Operating Companies

- › Germany
- › Italy
- › UK
- › France
- › Spain
- › Portugal
- › Poland
- › U.S.A.
- › Singapore / APAC
- › China
- › Developing Markets

### 1 Manufacturing Plant

- › Bremen, Germany

Distributors in 75 countries



- Headquarter
- GESTRA Operating Companies
- Sales Representative

## How can we support you?

We are happy to listen and discuss your up-to-date requirements and will support you in the best possible way.

**Talk to us!**



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