



Technology for
**paper and
pulp**

Körting

THE EJECTOR COMPANY

Controllable
steam jet compressors

Körting engineering for the paper and pulp industry

Technology for paper and pulp applications

Thermocompressors for the paper and pulp industry ensure drainage of the drying cylinders in paper-machine drying units, or compression of low-pressure steam so that it increases in steam supply networks. They are almost exclusively used in a pressure range that exceeds atmospheric pressure. Because they're designed as versions that are adjustable with a nozzle needle, Körting thermocompressors can respond flexibly to a wide range of operating conditions. Savings in steam consumption also drastically cut overheads.

HOW THEY WORK

Thermocompressors are part of the jet ejector group and don't require any mechanical drives. Instead, they use the energy of a flowing medium under pressure to generate a pumping action. Steam usually acts as the motive medium in thermocompressors.

High-pressure steam in a motive nozzle is released to bring it up to the maximum speed. At the same time, the pressure on the nozzle's outlet drops to draw in the steam that requires condensing. When the two flows are combined in the mixing section downstream, some of the motive flow's kinetic energy transfers to the suction flow. The mixed flow is then slowed down in the subsequent diffuser and a pressure gain occurs at the same time. This steam mixture can be used again in the process afterwards at the higher pressure level.

1/2) Körting thermocompressors in paper mills



You can find more information about Körting's thermocompressors for the paper industry and a practical questionnaire to obtain a quote quickly at: koerting.de/en/pulp-and-paper.html

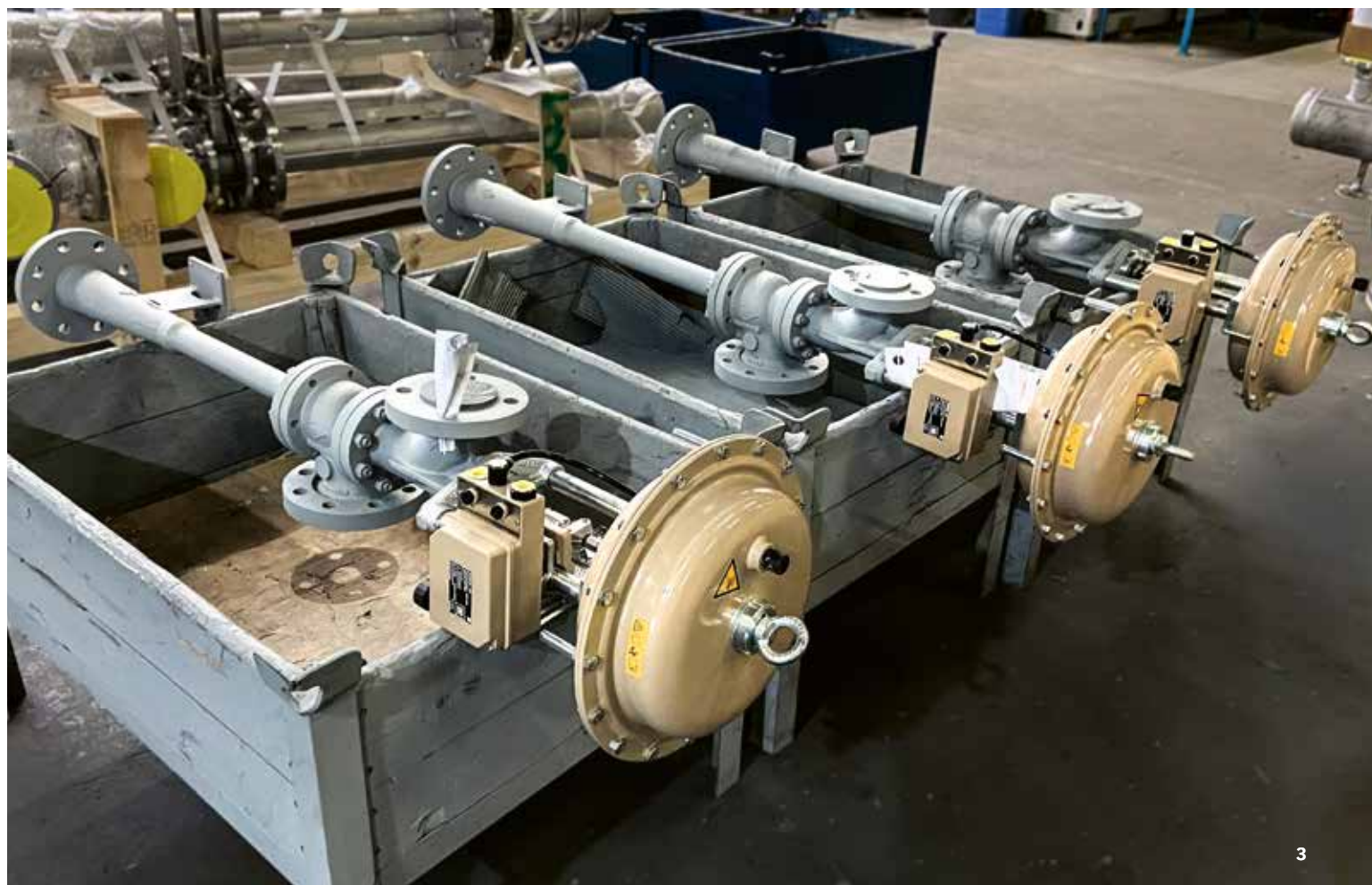
THE MANY ADVANTAGES OF KÖRTING THERMOCOMPRESSORS FOR THE PAPER AND PULP INDUSTRY

- ✓ Long service lives
- ✓ Low steam consumption due to adjustable motive steam
- ✓ Quick adaptation to new operating conditions
- ✓ Little maintenance is required
- ✓ Customised solutions with energy optimisation
- ✓ Exceptional reliability
- ✓ Easy operation
- ✓ High-quality manufacture to worldwide design codes



You can find all our certificates at
koerting.de/en/certificates-and-licenses.html

Controllable thermocompressors in Körting Hannover GmbH's plant

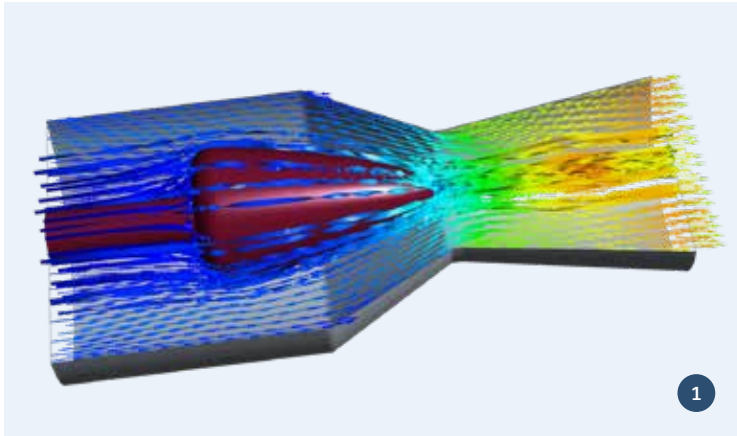


**EXCELLENT FLEXIBILITY
WHEN REMODELLING THE PLANT**

Paper machinery is operated for 30 years and more. Should operating conditions change, or the plant be remodelled, Körting thermocompressors can be adapted to suit the new parameters. As a result, the thermocompressor will continue to operate reliably even after a plant has been redeveloped. This cuts the investment costs and ensures production can continue efficiently.

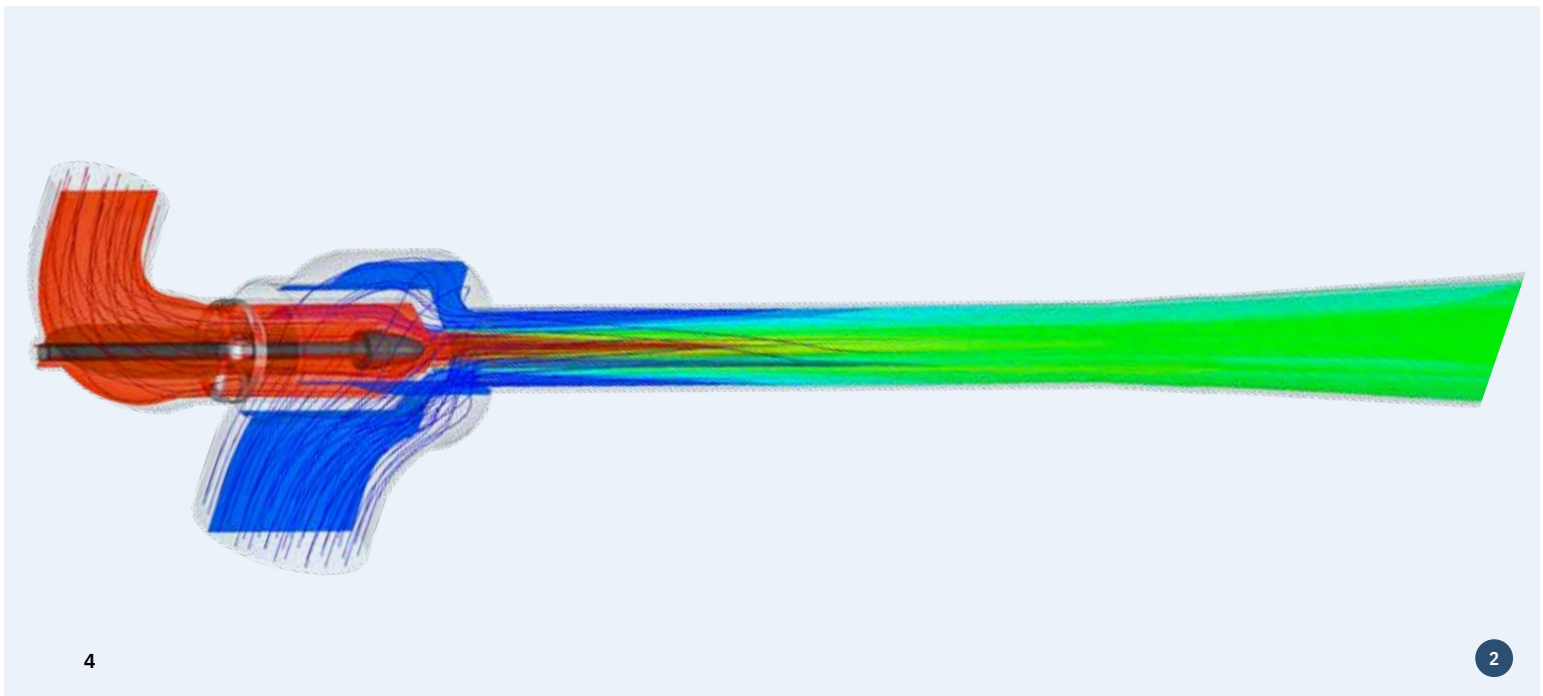
**PERFECT OPERATION THANKS
TO A PRECISE DESIGN**

Only a thermocompressor designed to handle the entire operating range can guarantee the plant operates flawlessly. Which is why Körting Hannover GmbH bases its designs on characteristic curves that were created on its own test rigs. This expertise has evolved over many decades in Körting Hannover GmbH's trial- and development-department and analysed with software developed in-house. CFD calculations (numerical flow simulations) have been complementing the results of the trials for several years now. These allow Körting to optimise the flow area, but can't replace the complex recording of characteristic curves in the test field. These skills make Körting thermocompressors leading products internationally.



1) A CFD simulation of a nozzle with a nozzle needle used to change the motive steam flow in Körting thermocompressors.

2) Flow pattern of a Körting thermocompressor created with a CFD simulation (numerical flow simulation)



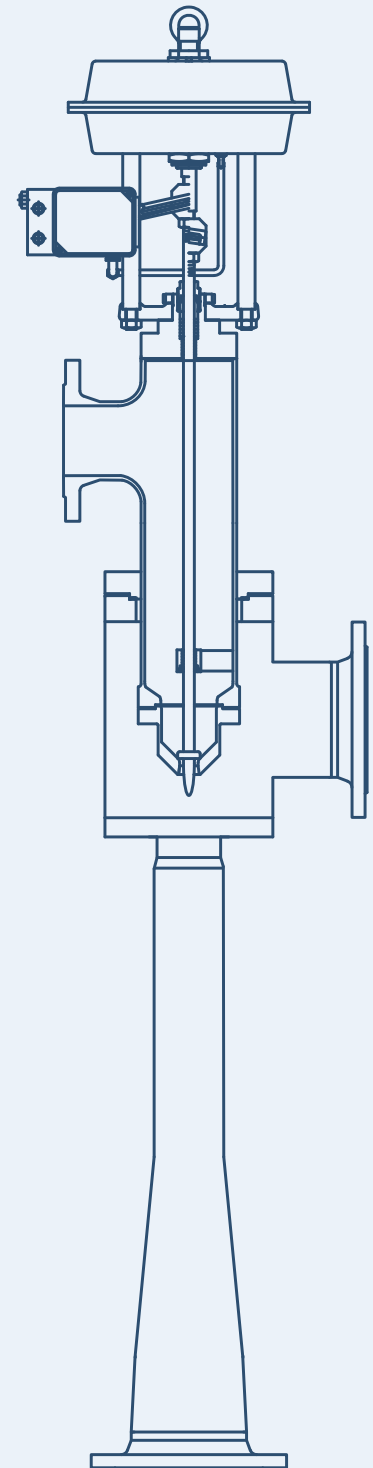
ADJUSTABLE NOZZLE NEEDLE

To increase the areas where they can be used, Körting thermocompressors come as controllable versions with adjustable nozzle needles. Therefore, it's possible to change the motive steam flow without having an impact on the motive pressure. In the part-load range, this means huge advantages in terms of motive steam consumption (and therefore energy consumption) compared with a solution requiring an external reduction in the motive pressure and a separate control valve.

MATERIALS

Thermocompressors are made of the following materials:

- Grey cast iron
- Carbon steel
- Stainless steel



A controllable thermocompressor ready for shipping



Head of a controllable thermocompressor



Applications

DRYING SECTIONS IN PAPER MACHINES

In a paper machine's drying section, the moist sheet of paper is conveyed over one or several drying cylinders. These cylinders are heated from the inside with steam. Their hot surfaces cause the water to evaporate, therefore drying the paper. The hot-steam condensate can't remain in the drying cylinders. An ever-thicker film of condensate impairs the heat transfer and causes energy consumption to rise. The condensate is expelled with a certain amount of steam from the cylinder (blow-through steam) so that the condensate can overcome the static height of the bottom edge of the cylinder to the hub and the centrifugal force.

Körting thermocompressor installed on a paper machine

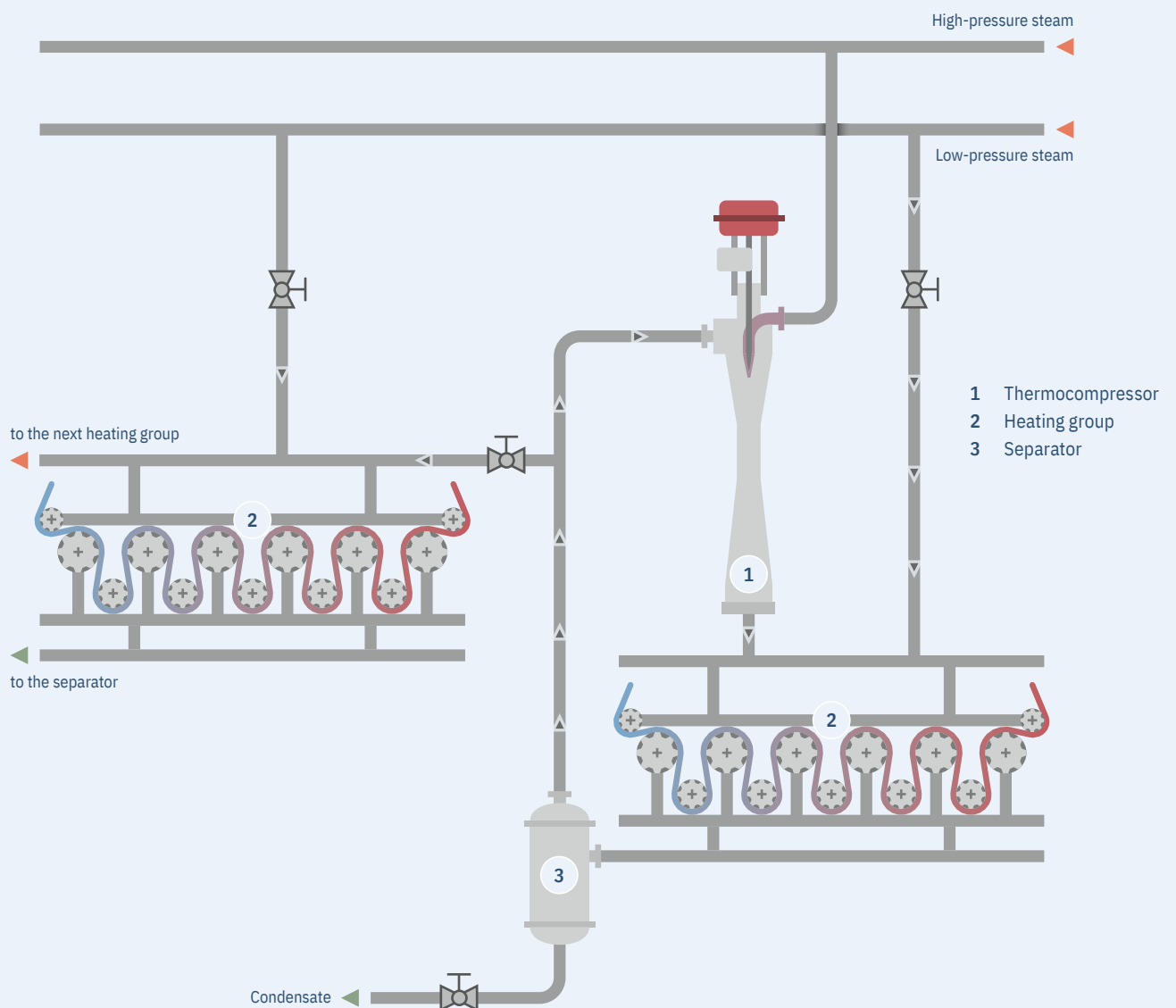


**Multi-cylinder paper machines
used to make fine paper and cardboard**

The multi-cylinder machines used to make fine paper and cardboard have several drying cylinders that are often combined to form heating groups. Steam and condensate are separated behind each dryer group and the steam

continues to flow to the next dryer group (a cascade system). The condensate is expelled via rotating or non-rotating siphons.

**A COMBINED CASCADE AND
CIRCULATION SYSTEM**

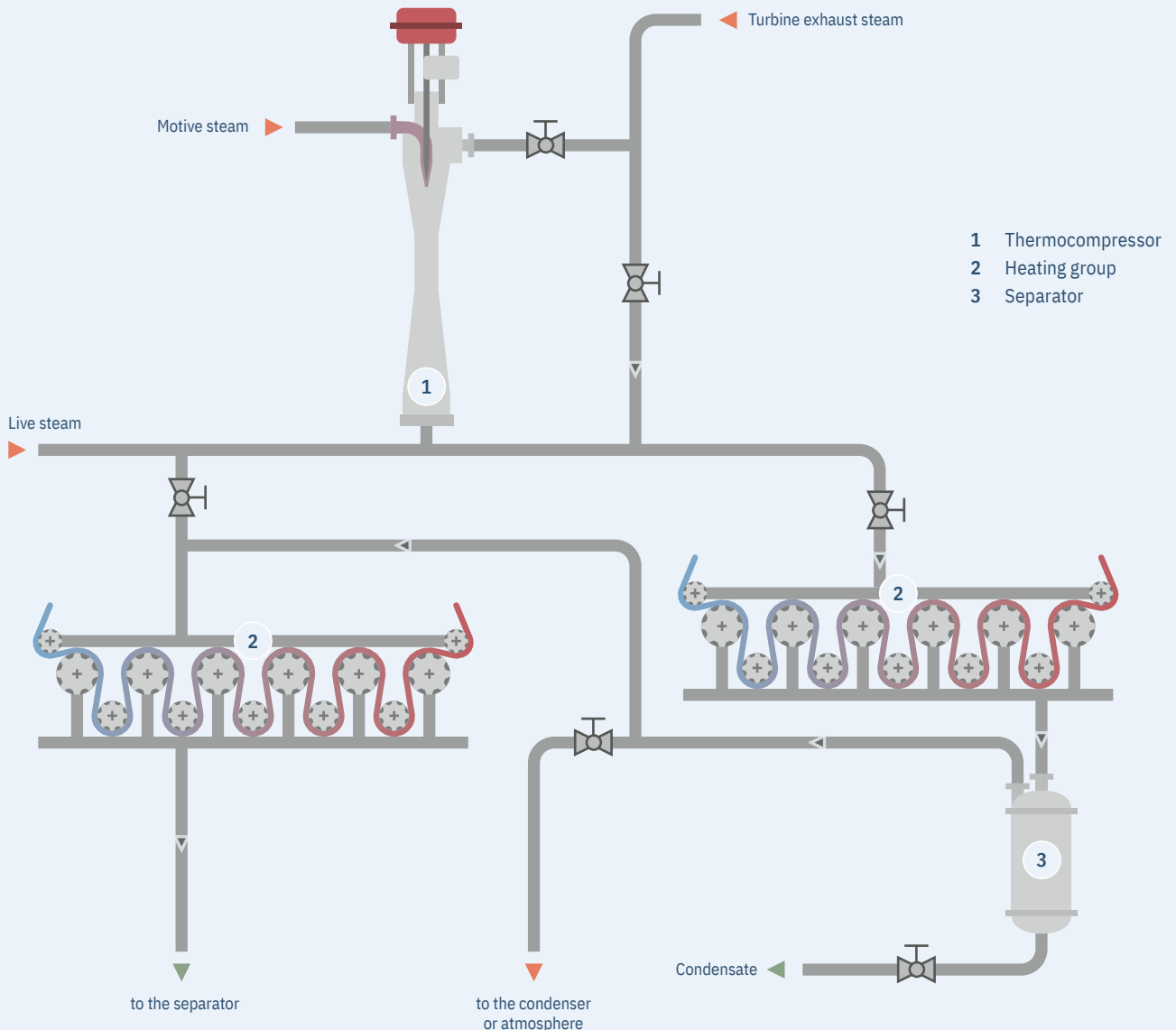


**Multi-cylinder paper machines
with production-related pressure adjustment**

In addition to continuous operation (as described above), thermocompressors can also be operated in stand-by mode. Thermocompressors are only used in intermittent

mode if the pressure has to be decreased or increased for operational reasons.

**PRESSURE INCREASE OF
TURBINE EXHAUST STEAM**

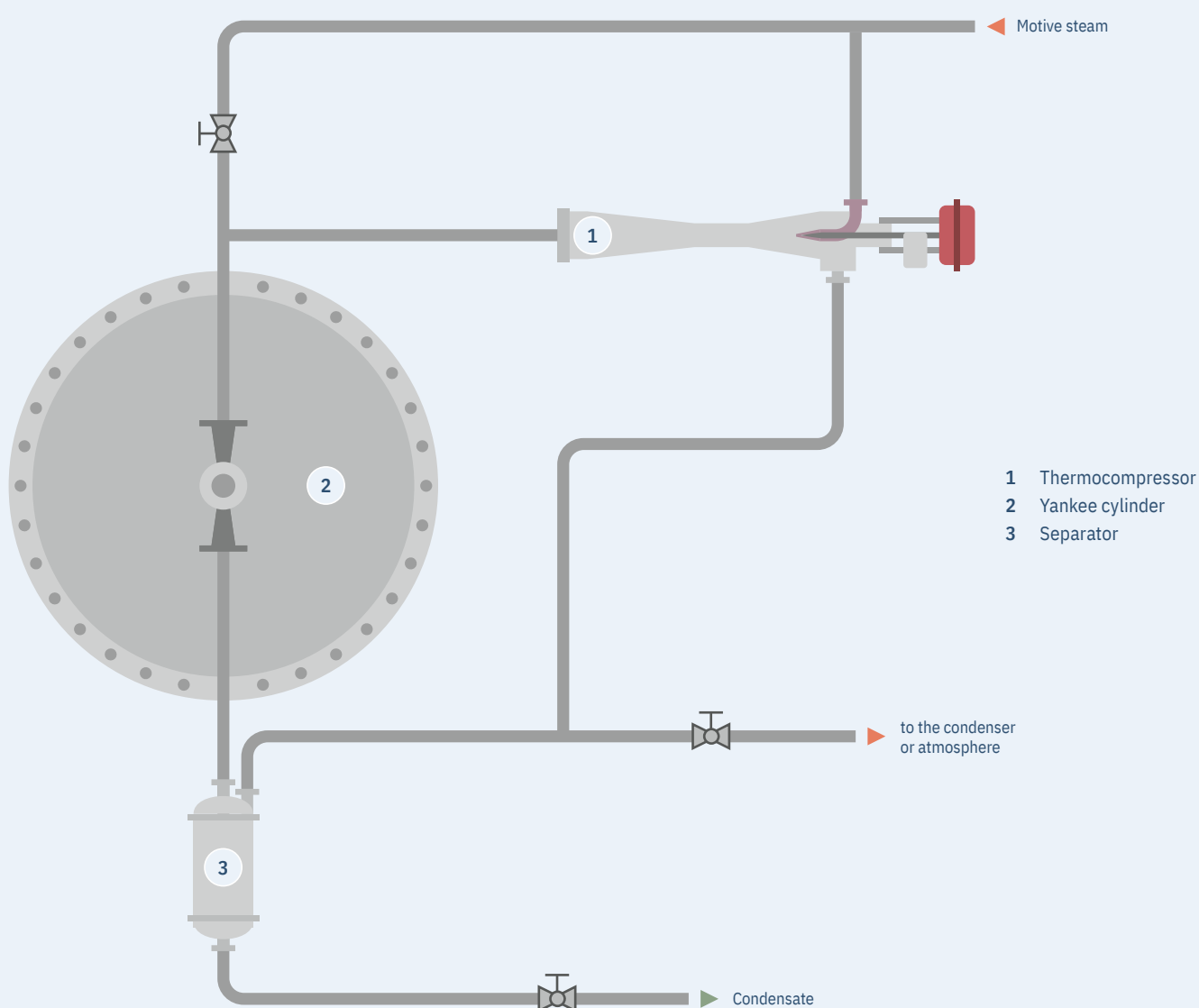


Single-cylinder paper machines

Single-cylinder paper machines are used to produce toilet tissue. These have one single large drying cylinder that can be several metres in diameter and length. They are often called yankee cylinders too. Good heat transfer and even temperature distribution over the entire surface of

the drying cylinder are important for the drying process. As a result, consistent removal of the condensate from the cylinder is vital and achieved with the aid of blow-through steam. This steam is condensed by Körting thermocompressors and circulated in a closed loop.

SINGLE-CYLINDER PAPER MACHINE (YANKEE)



LOW-PRESSURE STEAM SUPPLY NETWORKS

Used as heat pumps, thermocompressors can condense low-pressure steam to a higher pressure. Afterwards, the

higher pressure steam can be fed into a heating group or a central steam network or used again in other processes.

Further Körting products for the paper and pulp industry

In addition to thermocompressors, Körting has other products in high demand by the paper and pulp industry.

STEAM JET GAS COMPRESSORS IN PULP PRODUCTION

Körting steam jet gas compressors are ideal for extracting sulphurous gases generated during pulp production (CNCGs – concentrated non-condensable gases).



You can find more information about Körting's steam jet compressors for the paper industry and a practical contact form to obtain a quote quickly at: koerting.de/en/steam-jet-compressor.html



STEAM JET HEATERS

Körting steam jet heaters heat water with steam that condenses in the water. They operate quietly and with alternating loads of steam and water. Their excellent design makes them efficient and effective.



You can find more information about Körting steam jet heaters and a practical contact form at: koerting.de/en/steam-jet-heaters.html

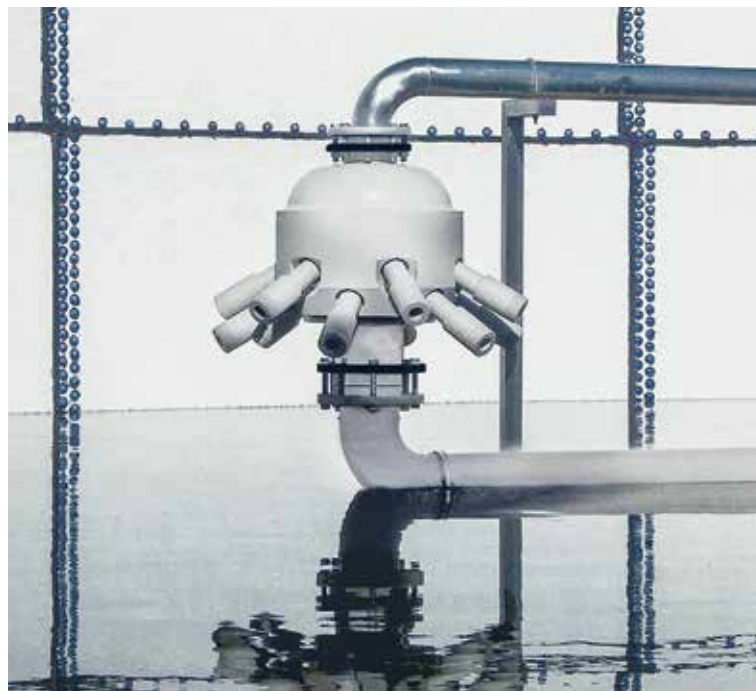


WASTEWATER AERATION WITH KÖRTING JET EJECTORS

Virtually every industrial park has sewage plants to clean or treat the process waste water created there. Extremely high concentrations of calcium carbonate can occur in the paper and pulp industry in particular. These place special demands on the aeration systems. In this case, Körting's oxygen injection systems are ideal and operate continuously and efficiently, even if the waste water has a high dry-matter content.



You can find more information about Körting wastewater aeration ejectors and a practical contact form at: koerting.de/en/water-treatment.html



COOLING WITH STEAM: STEAM JET COOLING SYSTEMS

Used as heat pumps, thermocompressors can condense low-pressure steam to a higher pressure. Afterwards, the higher pressure steam can be fed into a heating group or a central steam network or used again in other processes.



For more detailed information about Körting steam jet cooling systems and the practical questionnaire so that you can request a quote quickly, go to: koerting.de/en/steam-jet-chilling-plants.html





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