Save energy with **steam jet compressors**

THE EJECTOR COMPANY

Körting components for process engineering applications

Customised solutions

Steam jet compressors

Steam jet compressors are used in numerous process engineering applications and drastically reduce the energy consumption of the process concerned. As a result, they can cut the machinery's running costs consistently. Also known as thermocompressors or vapour compressors, steam jet compressors compress steam flows in various processes in a simple way.

HOW THEY WORK

Steam jet compressors are a type of jet ejector and require no mechanical drive. In order to achieve a pumping action, they use the energy from steam at a high level of pressure as the motive medium.

This steam is released in a motive nozzle to bring it up to the maximum speed. The nozzle outlet pressure drops to allow suction of the steam to be compressed. Both flows converge in the downstream mixing section. When the two flows are mixed, 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 is used in the process downstream at the higher pressure level.

1/2/3) Steam jet compressors being tested

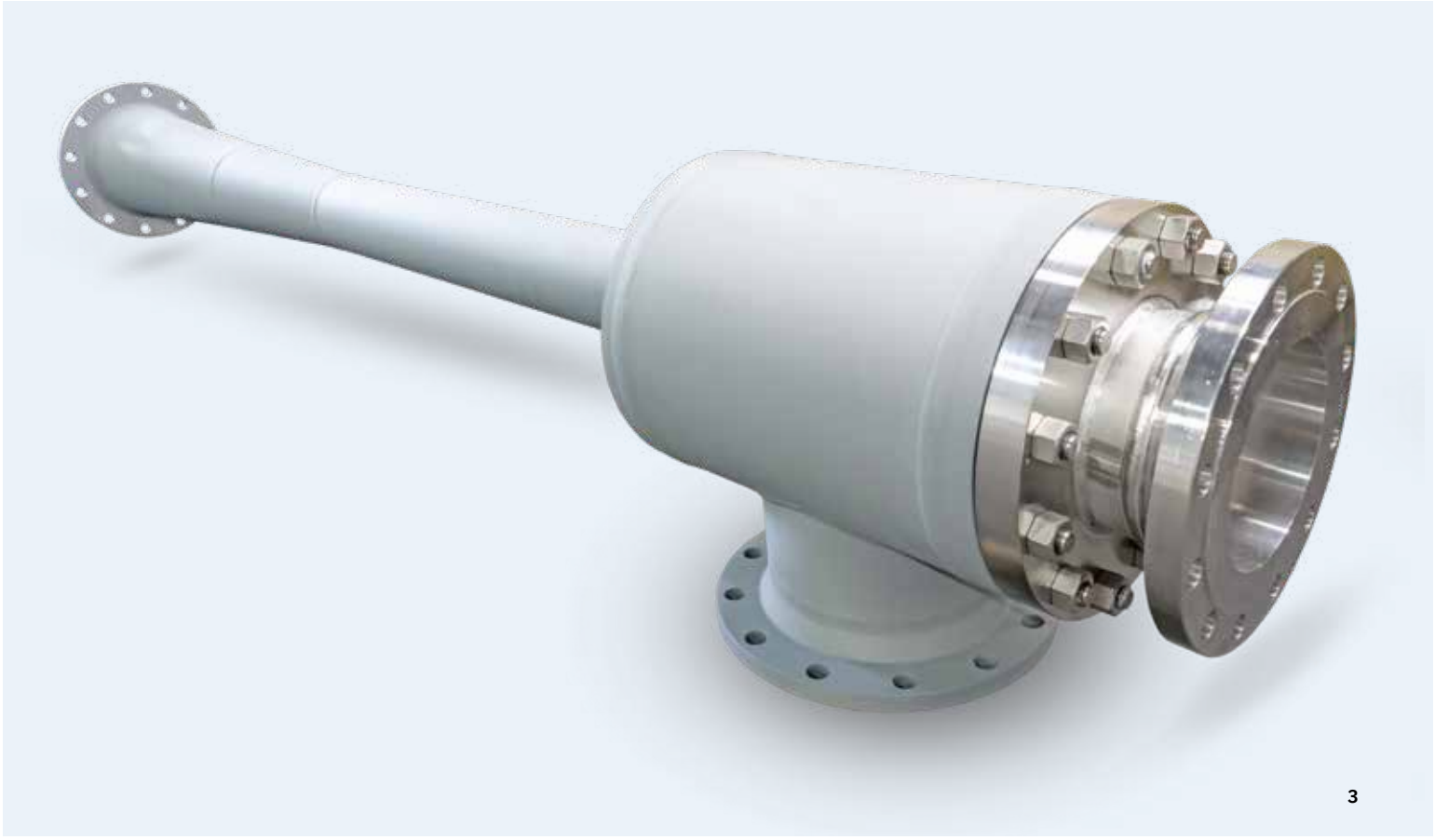
You can find more information about Körting's steam jet compressors for the paper industry and a practical contact form to obtain a quote quickly at: **koerting.de/en/steam-jet-compressor.html**

THE MANY ADVANTAGES OF KÖRTING STEAM JET COMPRESSORS

- Low steam consumption
- Long service lives
- The motive steam is controlled by valve or nozzle needle
- Unlike mechanical compressors, there are no movable parts
- Little maintenance is required
- Exceptional reliability
- Quick to adjust to new operating conditions
- High-quality manufacture to worldwide design codes

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

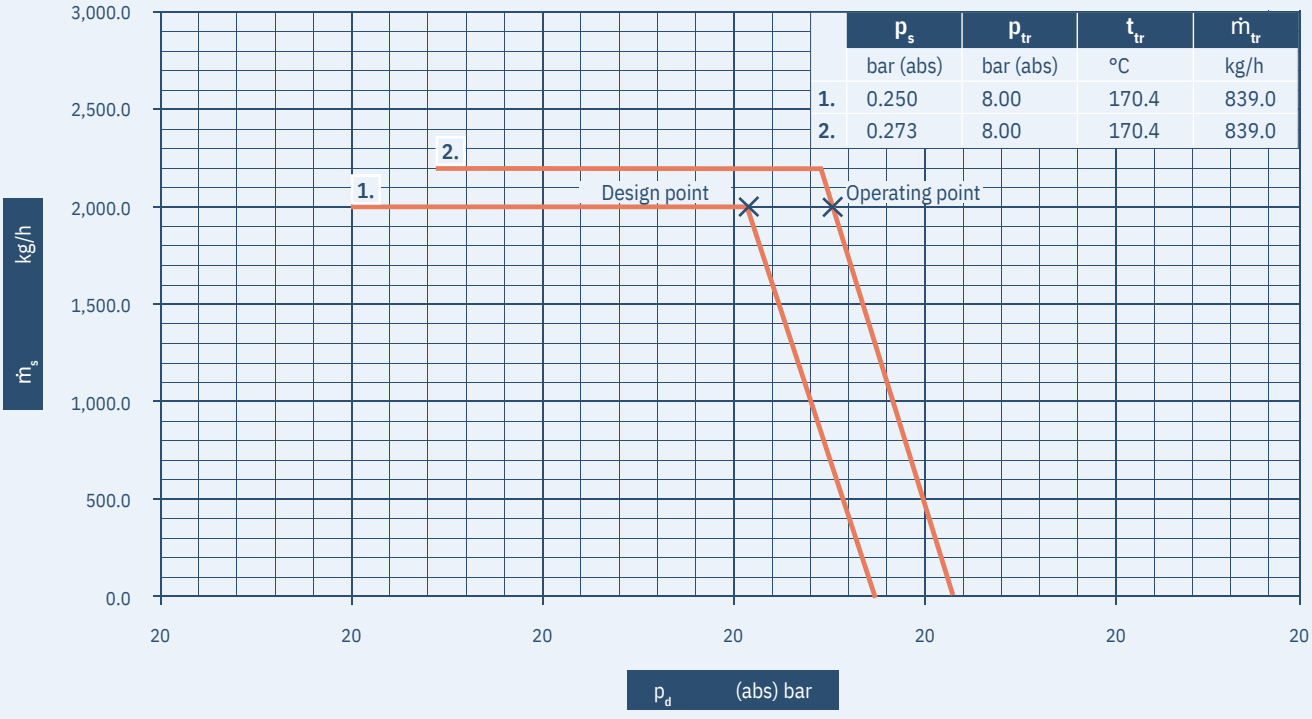
Körting steam jet compressor



PRECISE DESIGN

In order to ensure consistent and reliable operation, a steam jet compressor needs to be designed for the entire area the machinery operates in. The research and development department at Körting Hannover GmbH has been carrying out a series of measurements on special test rigs for decades. The results are then incorporated into the in-house database. These measurements govern the design of reliable and energy-efficient steam jet compressors and are combined with CFD (computational fluid dynamics) calculations. Consequently, we can optimise flow areas. By meticulously capturing and analysing characteristic curves during the testing process and carrying out CFD calculations, Körting leads the market on steam jet compressors across the world.

THE DESIGN AND OPERATING POINT OF A STEAM JET COMPRESSOR

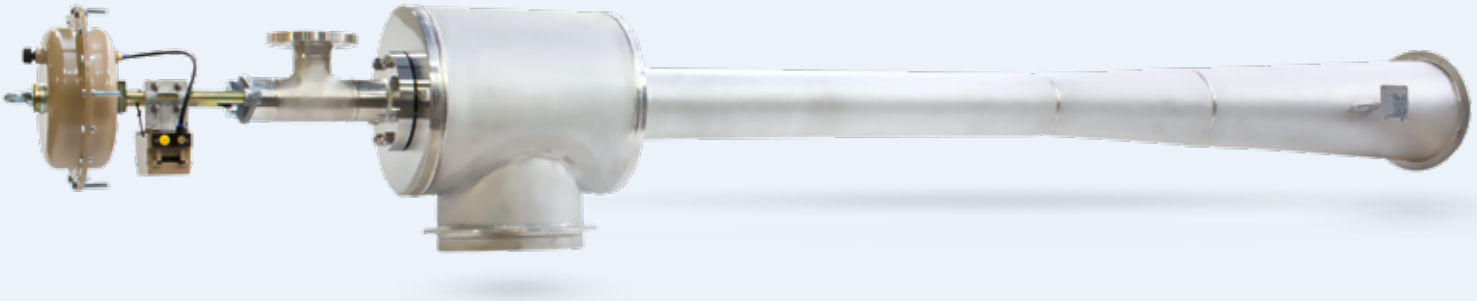


	p_s	p_{tr}	t_{tr}	$\dot{m}_{tr}$
	bar (abs)	bar (abs)	°C	kg/h
1.	0.250	8.00	170.4	839.0
2.	0.273	8.00	170.4	839.0

$\dot{m}_s$ Suction flow
p_s Suction pressure
t_s Suction flow temperature
p_{tr} Motive pressure
t_{tr} Motive flow temperature
$\dot{m}_{tr}$ Motive flow
p_d Discharge pressure

EXCELLENT FLEXIBILITY WHEN REMODELLING THE PLANT

Should machinery be modified or operating conditions change, Körting steam jet compressors can often be adapted to suit the new situation. This cuts the investment costs of the conversion and ensures production can continue efficiently.



Körting steam jet compressor with nozzle needle control

CONTROL CAPABILITY

The way steam jet compressors operate can be influenced by changing the motive steam flow. This can be effected in two ways:

Control valve

A standard control valve can be inserted into the motive steam pipe. This valve changes the steam flow, which is fed to the steam jet compressor. If the motive steam flow is decreased, lower motive pressure is generated in front of the motive nozzle. In the process, the pressure to accelerate the steam in the motive nozzle drops the more the motive steam flow is reduced. As a result, the control range is limited. By comparison, control via a nozzle needle delivers better results and lower energy consumption in part-load operation.

Nozzle needle control

A nozzle needle, driven by an actuator, changes the diameter of the motive nozzle and therefore the motive steam flow. In contrast to the control valve in the motive steam pipe, using a nozzle needle ensures consistent motive steam pressure. This means significantly lower energy consumption, especially in the lower part-load range.

The controllable version is used particularly frequently in the paper and pulp industry. For more information about this application, please see the Paper and Pulp Technology brochure.

MATERIALS

Steam jet compressors can be made in the following materials:

- **Cast iron**
- **Carbon steel**
- **Stainless steel**
- **Special materials (titanium, Hastelloy, etc.)**

MULTI-JET STEAM COMPRESSORS

In addition to the classic single-nozzle steam jet compressors, there's also a multi-nozzle version. This version is impressive for its more compact design, which means it's shorter and weighs less. In some areas, this design is even more efficient in terms of propellant consumption. Our Körting experts will help you choose the right design for your application.

Applications

Steam jet compressors are used in many process engineering applications thanks to their excellent operating characteristics (see page 3).

FOOD INDUSTRY

In evaporators that concentrate food (e.g. dairy products, fruit juices, coffee, cane- and beet-sugar juice), steam jet compressors are used to save live steam. Multi-stage falling film evaporators are the most widely used type of evaporator in this area. They concentrate the product gently in the vacuum, even at low temperatures. The result is a high-quality, flawless product.

PAPER INDUSTRY

In the paper and pulp industry, steam jet compressors are often called thermocompressors. In paper machinery, they 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. As a controllable version with nozzle needle control, they respond flexibly to different operating conditions and also significantly reduce operating costs.

THE CHEMICAL INDUSTRY

Steam jet compressors are used in the chemical industry in plants that produce alkalis (e.g. caustic soda), acids (e.g. citric acid), saline solutions, alcohols, synthetic glues, as well as natural organic products etc. They can still suction off column overhead steam and pump back the mixed flow for heating in the column.

LOW-PRESSURE STEAM SUPPLY NETWORKS

Used as heat pumps, steam jet compressors can condense low-pressure steam so that its pressure increases. Afterwards, the higher pressure steam can be fed into a central steam network or used again in other processes. Comparable applications can be found in almost all industries where large quantities of steam are required.

Körting steam jet compressors being loaded

Controllable steam jet compressors with nozzle needle control in the Hanover plant

SEAWATER EVAPORATOR

When desalinating seawater in evaporators (MEDs), Körting steam jet compressors recompress steam to heat an evaporator stage.

STEAM JET COOLING SYSTEMS

Steam jet compressors are used in special refrigeration systems to cool water, which is the coolant.

CRYSTALLISERS

Steam jet compressors are used in crystallisers that concentrate liquids that cool and thicken the solution at the same time.

For detailed information on Körting products and where they're used, as well as the practical questionnaire to request a quote quickly, go to: **koerting.de/en**

1) Steam jet compressor in the production department in Hanover
2) Multi-effect evaporator (an MED) with a Körting DN 2400 steam jet compressor to desalinate saltwater
3) Körting steam jet cooling system with a cooling capacity of 24 MW

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