



Steam Jet Heater ORK

Water Heating by steam

- **low noise**
- **controllable**
- **reliable**





Why "still" another heater?

The most simple way to heat up water for processes etc. is the direct injection of steam. The fundamental concept is simple, but the practical performance is difficult. Various products being in the market with different design features have proven this statement.

A special problem arises when steam jet heaters must have a variable performance. When using conventional heaters in some ranges of operation whistling, cracking, condensation shocks are obviously not to be avoided.

That is why from practical operation results the idea of the steam jet heater ORK, because there was no heater in the market which was:

- low noise - controllable - reliable.

The idea was followed by most promising tests. Now, at the end of extensive series of tests, the patented steam jet heater ORK results in :

- low noise operation at variable flows of steam and water,
- insignificant pressure losses,
- construction without movable parts, therefore low wear and maintenance.

How does the steam jet heater ORK operate?

The operating principle is comparable with that of a tube condenser, the tubes of which are "sawn off" near the second tube plate. At the tube plate the steam is passed into the heater bundle around which the water in unidirectional flow circulates. Some of the steam condenses in the tubes so that there is a steam-condensate-mixture at their outlets. This mixture enters the partly heated water, mixes with it and condenses completely here, so that the water has got an outlet temperature corresponding to the steam input when leaving the heater.

The steam load of the steam jet heater ORK can - theoretically - be varied within the limits of 0 ... 100 %. This range of adjustment is practically determined by the characteristic of the pre-connected steam regulating valve. The outlet temperature of the condensate-water-mixture can approach the boiling temperature belonging to the outlet pressure except for 2 °C.

The total operating range - dependent on the nominal width of the heater - can be noted from the attached table of performance data.

In which manner is the steam jet heater ORK to be installed?

The best results will be attained when installing the unit in vertical position - with flow direction from top to bottom. Other positions of installation are possible under certain conditions. We are quite prepared to assist you.

Which standard materials are available?

Generally the heater bundle is made of chrome-nickel steel. The casing and the steam chest are available in GGG-40 and in chrome-nickel steel. The possible combination of these materials can be noted from the referring Techn. Data Sheet.

For the time being we are preparing a version with integrated steam regulating valve.

The basic principle of the construction is the use of standardized components. This ensures favourable prices and short delivery times.

If there should still remain some questions,

please do not hesitate to contact us. We are quite prepared to discuss with you the possibilities of application of steam jet heaters ORK for your system.



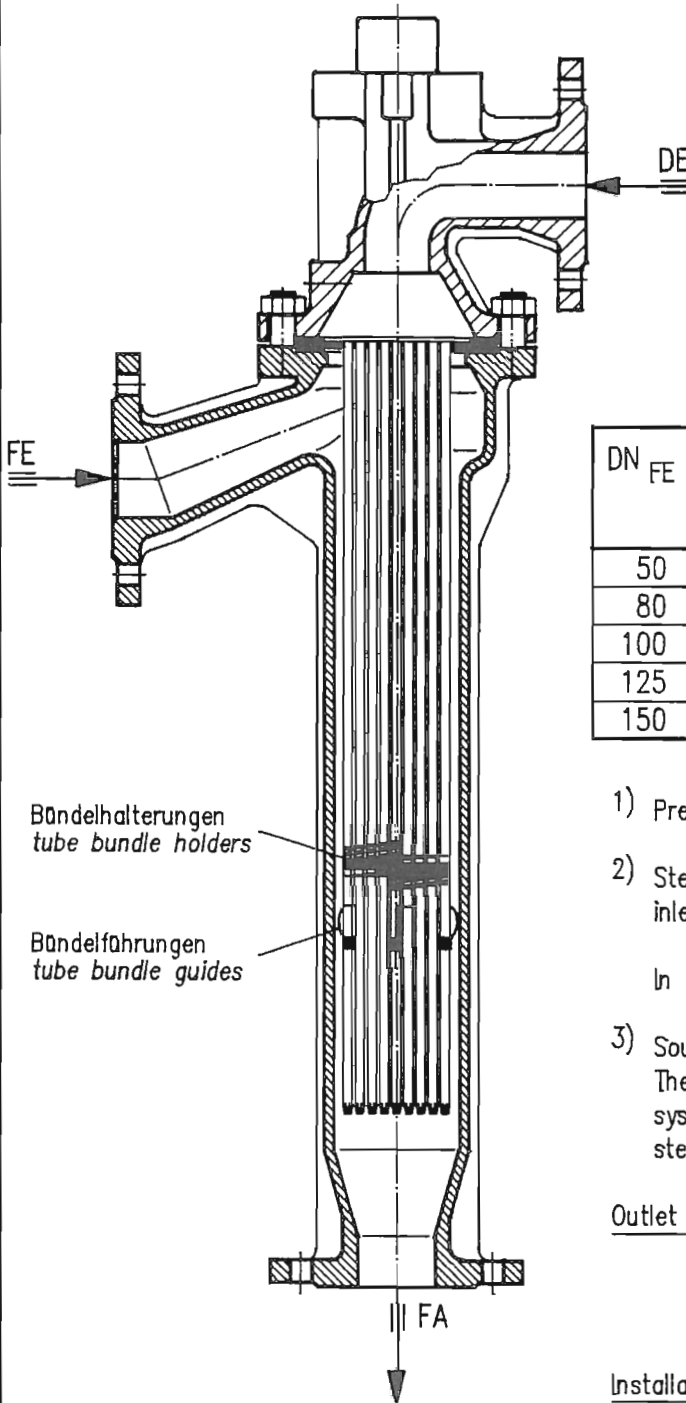
Steam Jet Heater Type ORK

KI-10-90-1e

Principle / Table of Performance Data

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DE = Dampf-Eintritt
steam inlet

FE = Flüssigkeits-Eintritt
liquid inlet

FA = Flüssigkeits-Austritt
liquid outlet

DN	FE	\dot{V}_{water} ¹⁾ (m ³ /h)	\dot{m}_{steam} (kg/h) ²⁾		LP (dB(A)) ³⁾		
			0	normal max.	0	normal	max.
50	1... 26	0	488	732	74	79	84
80	2... 42,5	0	872	1308	74	81,5	86
100	3... 65	0	1300	1900	74	83	88
125	4... 92	0	2100	3000	74	85	90
150	5... 152	0	3500	5200	74	87	92

- 1) Pressure loss: 0,01...0,2 bar
- 2) Steam pressure at the inlet of the heater: depending on the water system pressure and on the steam rate. In individual case, please ask for the exact value.
- 3) Sound pressure level dependent on the steam flow rate. The sound pressure levels increase in case of a water system pressure of > 10 bar and a superheating of the steam of > 30 °C.

Outlet temperature: The maximum admissible outlet temperature lies below the boiling temperature belonging to the water outlet pressure by 2 °C.

Installation: Preferably in vertical position, flow direction of the water from top to bottom. In case of other positions of installation, please contact us.

Constructions, dimensions, weights and requisition numbers according to the special technical data sheets.



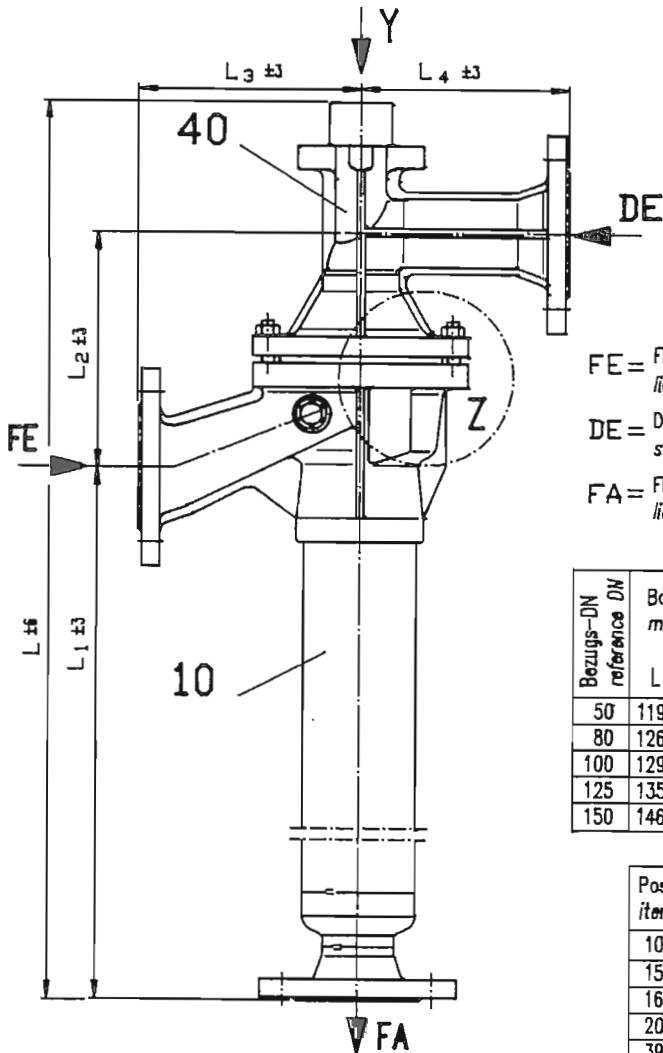
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Steam Jet Heater Type ORK
made of stainless steel
steam chest of GGG-40, dimension of
connection flanges $\hat{=}$ DIN 2501 PN 16

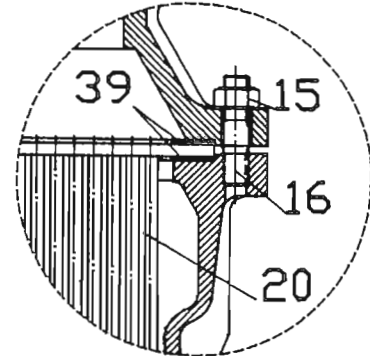
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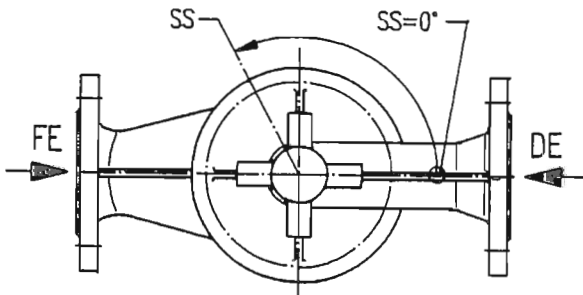
FE = Flüssigkeits-Eintritt
liquid inlet
DE = Dampf-Eintritt
steam inlet
FA = Flüssigkeits-Austritt
liquid outlet



Einzelheit Z

Bezugs-DN reference DN	Baumaße: main dimensions					Anschlußmaße: connection dimensions DN				Gewicht weight (kg)	Bestell-Nummer: requisition no.	
	L	L ₁	L ₂	L ₃	L ₄	FE	FA	DE	W			
50	1195	887	195	184	123	50	50	50	30	33	10140	503350
80	1267	930	229	215	142	80	80	65	30	45		503351
100	1290	920	264	257	166	100	100	80	22,5	59		503352
125	1357	920	326	287	206	125	125	100	30	88		503353
150	1465	955	392	325	247	150	150	125	22,5	118		503354

Pos.: item:	Benennung: designation:	Werkstoff: material:
10	Gehäuse body	GS-CrNi-St/CrNi-St
15	Mutter DIN 934 nut DIN 934	CrNi-St (A2)
16	Stiftschraube DIN 939 stud DIN 939	CrNi-St (A2)
20	Erhitzerbündel heater bundle	CrNi-St
39	Dichtung gasket	lt 400
40	Dampfkammer steam chest	GGG-40



Ansicht "Y"

Der Stutzen DE kann jede durch den Winkel "W" teilbare
Stutzenstellung "SS" einnehmen. (Standardstellung DE $\hat{=}$ SS=0°)

Nozzle DE can take any nozzle position "SS" divisible
by angle "W". (Standard position DE $\hat{=}$ SS=0°)

Achtung !

Erhitzer kraft- und momentenfrei montieren;
Rohrleitungen abfangen:

Attention !

Heater to be assembled free of forces and moments;
support the pipelines.

Nennndruck der Apparate entspr. DIN 2401 Teil 2, PN16
Nominal pressure of the units acc. to DIN 2401 part 2, PN16



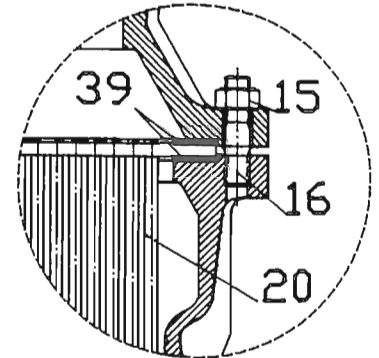
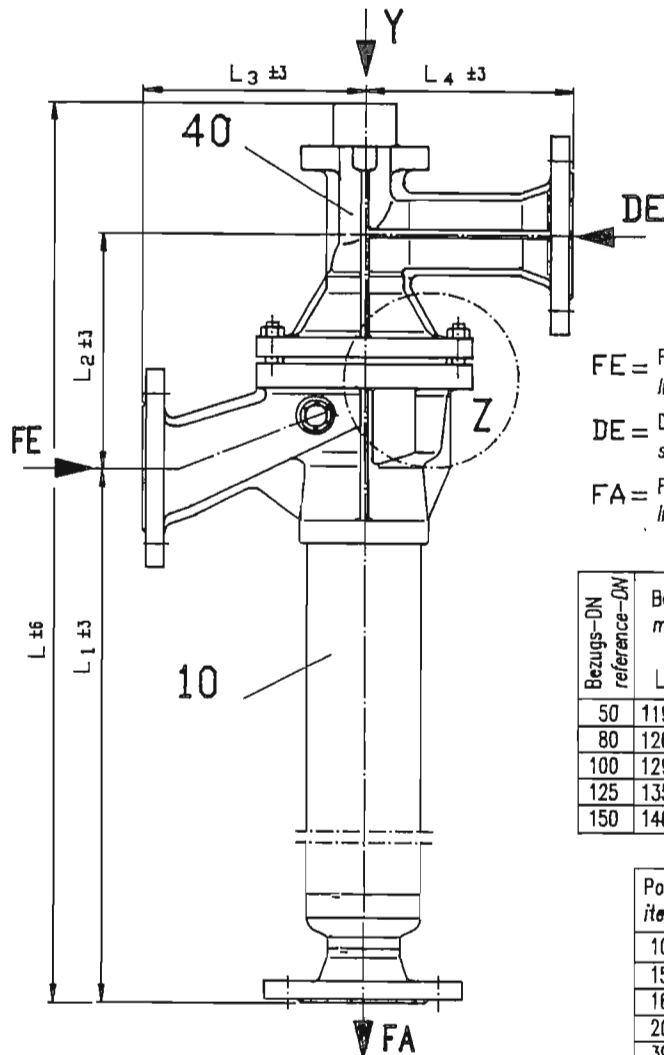
Steam Jet Heater Type ORK
made of stainless steel, dimension of
connection flanges $\hat{=}$ DIN 2501 PN 16

KI-10-90-1e

TD 10145

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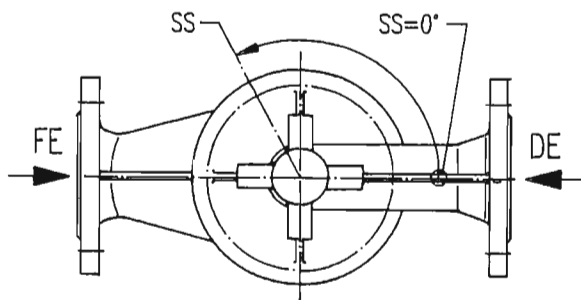


Einheit Z

FE = Flüssigkeits-Eintritt
liquid inlet
DE = Dampf-Eintritt
steam inlet
FA = Flüssigkeits-Austritt
liquid outlet

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50	1195	887	195	184	123	50	50	50	30	33	10145	503330
80	1267	930	229	215	142	80	80	65	30	45		503331
100	1290	920	264	257	166	100	100	80	22,5	59		503332
125	1357	920	326	287	206	125	125	100	30	88		503333
150	1465	955	392	325	247	150	150	125	22,5	118		503334

Pos. item:	Benennung: designation:	Werkstoff: material:
10	Gehäuse body	GS-CrNi-St/CrNi-St
15	Mutter DIN 934 nut DIN 934	CrNi-St (A2)
16	Stiftschraube DIN 939 stud DIN 939	CrNi-St (A2)
20	Erhitzerbündel heater bundle	CrNi-St
39	Dichtung gasket	It 400
40	Dampfkammer steam chest	GS-CrNi-St



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Heater to be assembled free of forces and moments;
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Nennndruck der Apparate entspr. DIN 2401 Teil 2, PN16

Nominal pressure of the units acc. to DIN 2401 part 2, PN16



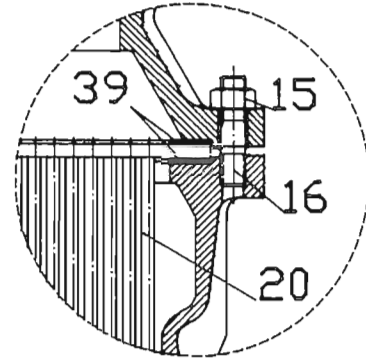
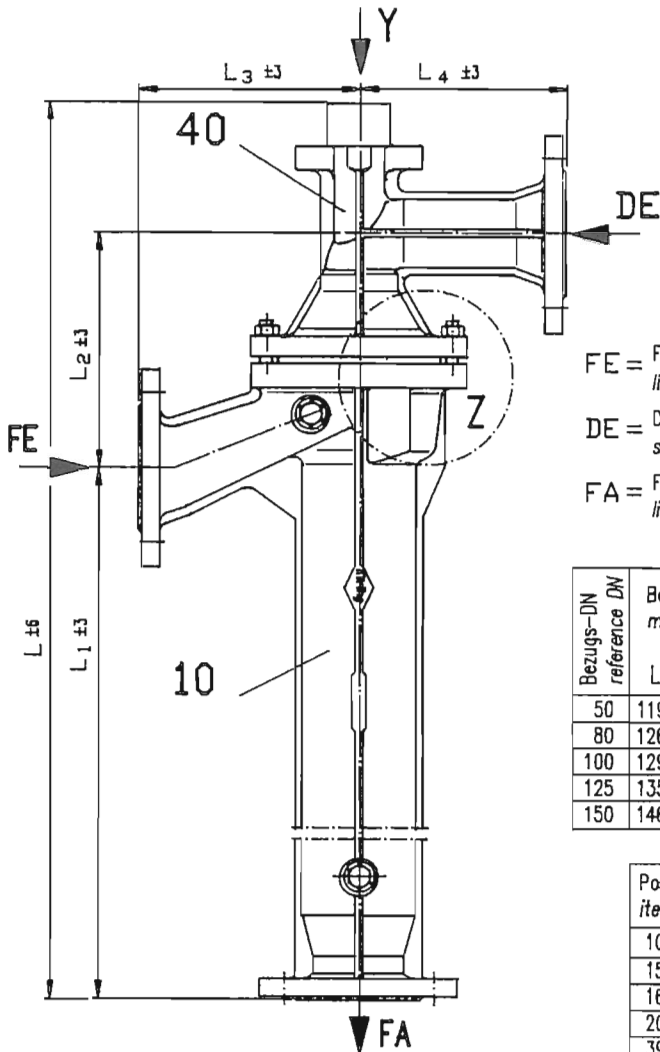
Steam Jet Heater Type ORK
made of GGG-40, dimension of
connection flanges $\hat{=}$ DIN 2501 PN 16

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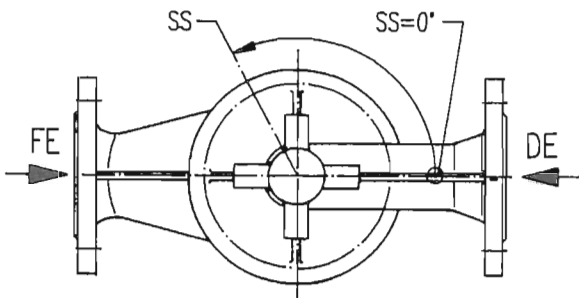
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Einzelheit Z

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125	1357	920	326	287	206	125	125	100	30	95		503313
150	1465	955	392	325	247	150	150	125	22,5	139		503314

Pos. item:	Benennung: designation:	Werkstoff: material:
10	Gehäuse body	GGG-40
15	Mutter DIN 934 nut DIN 934	C-St. 5
16	Stiftschraube DIN 939 stud DIN 939	C-St. 5.6
20	Erhitzerbündel heater bundle	CrNi-St
39	Dichtung gasket	It 400
40	Dampfkammer steam chest	GGG-40



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support the pipelines.

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Nominal pressure of the units acc. to DIN 2401 part 2, PN16

**General:**

The advantages of the steam jet heater ORK are its smooth running and its large range of adjustment. The steam jet heaters ORK have been developed for heating up of clean water by direct introduction of steam. To obtain optimum operation, it is absolutely necessary to adhere to the operating data mentioned in the attached table of performance data. In case where the real operating data deviate from those of the table of performances, correct operation of the heater cannot be guaranteed. If operating data should change, please submit us the new operating data for examination and approval.

Assembly:

When installing the heater, the approved rules of engineering are to be applied. Special care should be taken that the pipe lines for supply and discharge are installed in such a way that they do not initiate forces and moments and that cloggings caused by welding globules, residues of sealing material or similars, do not occur.

The steam regulating valve - to be procured at jobsite - is to be mounted just on the steam nozzle. It is recommended to provide for a suitable device (such as steam strainer) in order to prevent that foreign matters having a diameter of more than 2 mm can enter the heater through the steam nozzle.

The unit should be installed preferably in vertical position - with flow direction of the water from top to bottom. In this position of installation the highest possible range of adjustment and the lowest sound radiation are to be achieved.

In case of filling, the plant is completely to be vented.

Commissioning and Shutdown:

First start water circulation (e.g. by opening of a valve or by starting the pump), then open the steam valve and adjust it to the required pressure.

The steam valve must be readjusted until the determined outlet temperature will be reached.

In case of shutdown, the steam valve must be closed first and then the water circulation.

Maintenance:

Steam jet heaters ORK operate without moving parts. Therefore, only an unimportant wear is to be expected. Maintenance is to be made during stoppage of the plant - at least one maintenance per year - in the following manner:

1. Release the connection between steam chest and casing for inspection of the sealing surfaces.
2. Removal of the heater bundle for inspection of the bundle holder below. If the tube surfaces show deposits, the latter can be removed by a suitable chemical or mechanical treatment. When doing so attention should be paid to the requirement that the method applied do not attack the material of the heater bundle (18/8 chrome-nickel steel) or corrode the surfaces respectively. The safety rules normally applied in case of such a treatment should be observed.
3. Assembly of the bundle and of the steam chest: use new gaskets.

Care should be taken that cloggings caused by welding globules, residues of sealing material or similars do not occur.

Product range

Ejectors

Steam jet compressors (Thermocompressors)
Steam jet vacuum ejectors
Steam jet liquid ejectors

Gas jet compressors
Gas jet vacuum ejectors (e. g. in combination with liquid ring pumps)
Gas jet solid ejectors (pneumatic transport)
Gas jet mixing units
Waste gas ventilators

Liquid jet gas compressors
Liquid jet vacuum ejectors
Liquid jet liquid ejectors
Liquid jet solid ejectors

Multi Stage Steam Jet Vacuum Systems

Water vapour as motive medium :
- without intermediate condensation
- with mixing condensers (closed loop systems)
- with surface condensers
- combinations with liquid ring vacuum pumps

Process vapours as motive medium :
- with mixing condensers (closed loop systems)
- with surface condensers
- combinations with liquid ring vacuum pumps

Process Technology

Ice- / dry- and low temperature condensation systems

Vacuum refrigeration plants and crystallisation plants

Evaporation plants (for mercerizing lye)

Plants for de-dusting, absorption and gas cooling

Components for the Process Technology

Venturi- and jet gas scrubbers

Swirl droplet separators

Ejectors for water- and waste water aeration

Steam jet liquid heaters

Liquid jet mixing nozzles

Steam desuperheaters

Mixing condensers (direct contact)

Surface condensers (shell and tube)



Körting Hannover AG

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Vacuum Technology

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