The controllable nozzle steam ejectors, Jetomat baelz 590 + baelz 591 with external or internal recirculation

Save energy, simplify steam system lay-out, improve performance of heat consumers by using the Bälz technology Bälz-vapordynamic for the 2 product families: baelz 590 controllable nozzle steam / steam ejectors
baelz 591 generators of saturated steam; pressure reducing + desuperheating

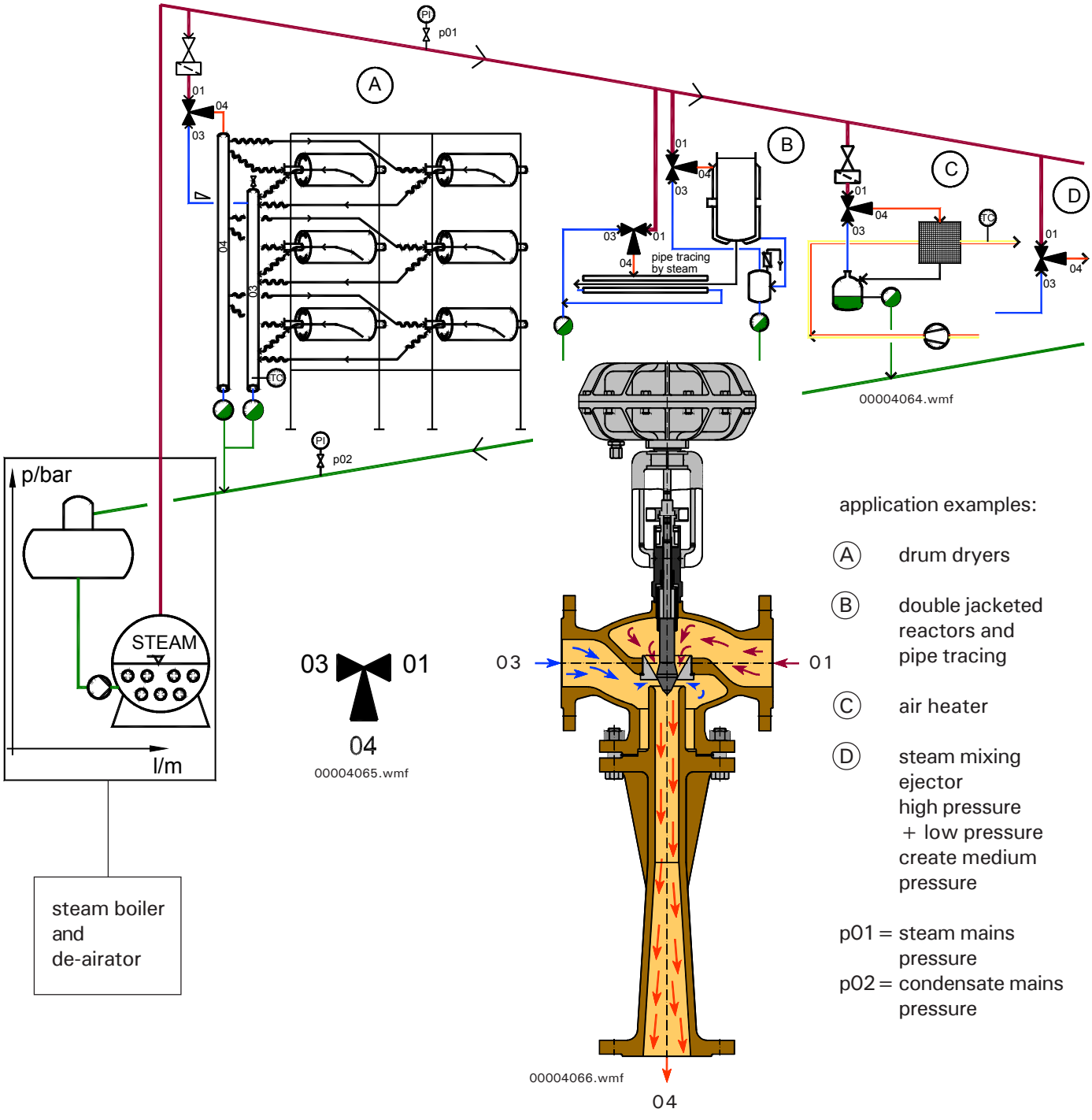

Fig. 1 Application examples with steam ejector baelz 590

 TA-JS 2'+4

W. Bälz & Sohn GmbH & Co. Koepffstraße 5 D-74076 Heilbronn Telefon (07131) 15 00-0 Telefax (07131) 15 00-21

The controllable nozzle steam ejectors, Jetomat baelz 590 + baelz 591 with external or internal recirculation

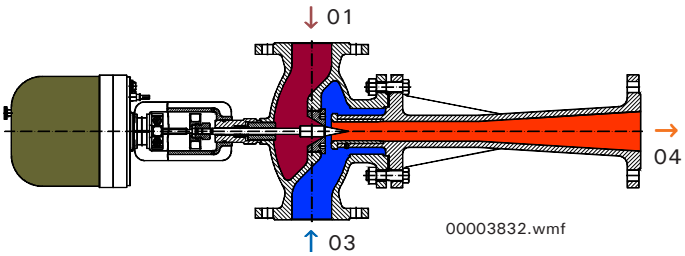

Fig. 2 Motorized steam ejector baelz 590-373-E40

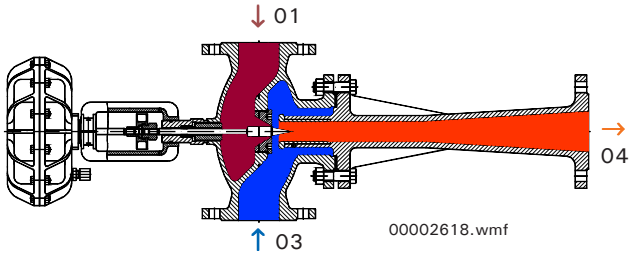

Fig. 3 Pneumatic steam ejector baelz 590-373-P21

The two mostly used typical steam ejector applications:

recirculation ejector baelz 590

To assure increased heat transfer: replace control valves by ejectors with steam recirculation

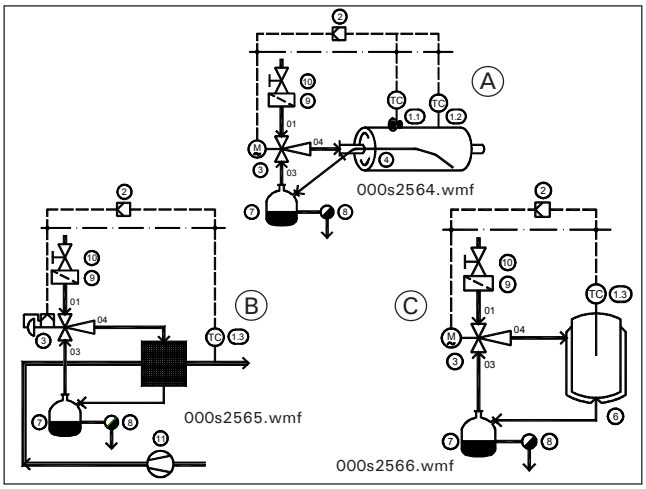

Fig. 4 On calanders (A), air batteries (B) and double jacketed reactors (C)

re-evaporated steam / flash steam compressor baelz 590

re-use waste steam or re-evaporated steam or flash steam

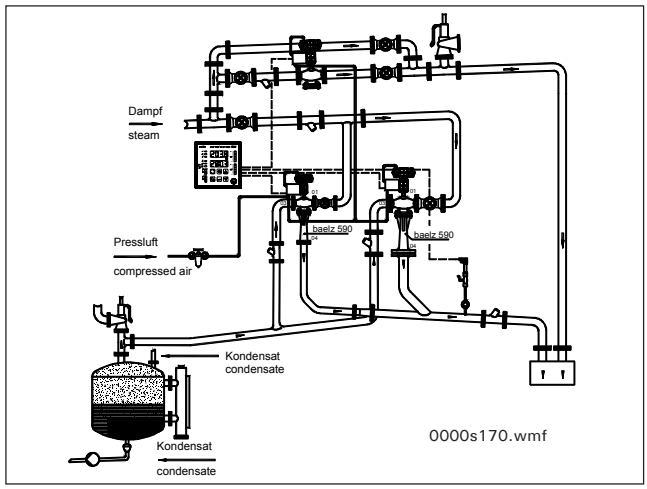

Fig. 5 P + I diagram with 2 ejectors to reutilize flash steam with an additional pressure reducing valve for start-up

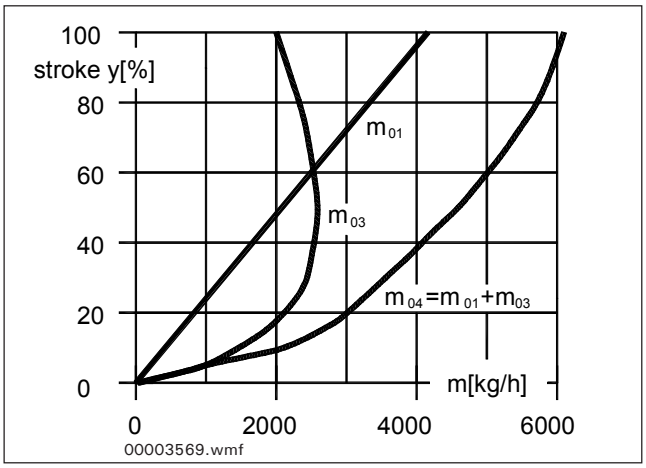

Fig. 6 Characteristics of a recirculation ejector; suction beginning for strokes y >0%

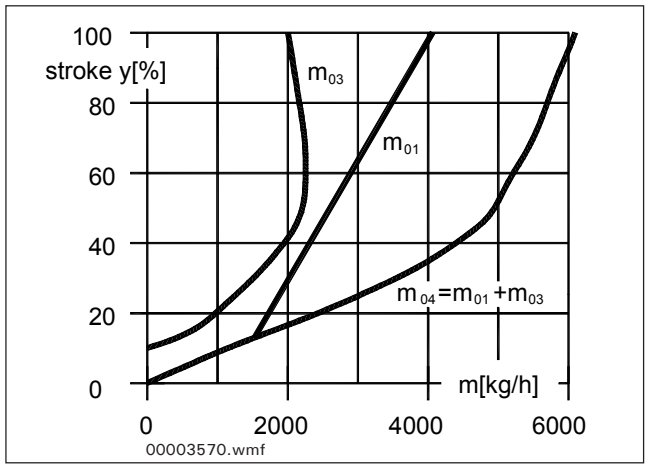

Fig. 7 Typical characteristics of a waste steam compressor; no suction for a stroke here <10%!

Bälz-vapordynamic - controllable nozzle ejectors steam/steam

Ejector series steam/steam baelz 590

Checklist:
ND: 15 - 300
NP: 16 / 25 / 40
standard body:
NP 16 + NP 25:
GJS-400-18-LT (GGG 40.3)
NP 40: GP240GH (GS-C25)
temperatures:
min.: -10°C
max.: +240°C or
+350°C type K

ND 15 - 125	spindle Ø: 10 mm
up to ND 100/nozzle ≥ 40 mm	spindle Ø: 16 mm
ND 150 - 300	spindle Ø: 22 mm

ND	15	25	32	40	50
nozzle	6.5	10	12.5	16	20
ND	65	80	100	125	150
nozzle	25	32	40	50	65

Short presentation of all electric and pneumatic actuators see BPE 18

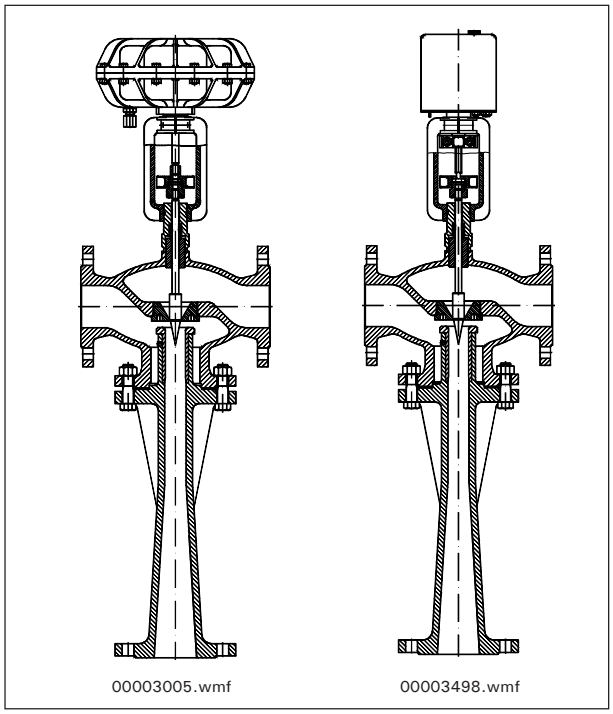

Fig. 8 Controllable steam ejector with pneumatic actuator baelz 590-373-P21-6-Fo-S21
and with electrical motorized actuator
baelz 590-373-E07-20-18-S21

Text for quotations + orders:

controllable steam ejector Jetomat for vapour compression / recirculation
without actuator
body material
NP 16 + NP 25 : GJS-400-18-LT (GGG 40.3)
NP 40 : GP240GH (GS-C25)
diffuser material
NP 16 + NP 25 : ND 15 - 125 GJS-400-18-LT (GGG 40.3) with throat in stainless steel
ND 150 - 300 with welded diffuser, throat in stainless steel
NP 40 : ND 15 - 300 with welded diffuser, throat in stainless steel
nozzle and spindle : stainless steel
stuffing box : V-rings in PTFE
temp./pressure
NP 16:max. 240°C/11 bar or max. 120°C/16 bar
NP 25:max. 240°C/18 bar or max. 120°C/25 bar
NP 40:max. 240°C/32 bar or max. 120°C/40 bar
stroke : ND 15-125 : 22 mm
up to ND 65/nozzle ≥ 25 mm : 40 mm
ND 150 : 44 mm
ND 200 - 300 : 66 mm

590-P32-DN150-1.JPG

Fig. 9
baelz 590-373-P32

Service conditions:

	01 motive	03 suction	04 discharge	dB (A)
pressure [bar abs]				
flow [kg/h]				

max. allowable differential pressure
Δp_0 : ..... bar

Bälz-vapordynamic - controllable nozzle ejectors steam/steam

Controllable steam ejectors

Controllable steam ejectors are used for the most different tasks in the heat and process technology. In the following there are only five applications given.

1. Vapour recompression. Low pressure steam, which is lost in conventional installations, or re-evaporated condensate is compressed to a higher pressure and can be re-used. The savings of primary energy which are obtained by this technology are considerable.
2. Steam conditioning. High pressure steam and low pressure steam are mixed into product steam. If necessary, its temperature can be reduced by water injection in the ejector down to saturated steam temperature. This technology saves primary energy by re-using low pressure steam and it saves investment costs in comparison with conventional methods (reduction valves with integrated or downstream water injection).
3. Re-circulation and suction of steam and condensate in drum dryers of paper and textile industry. This technology has, in comparison with heating by control valves, the following advantages:
   A. Savings in steam traps, because several cylinders can be controlled in parallel and e.g. for three cylinders only one steam trap is needed, not 3.
   B. Savings in steam, because the drum is completely at the same temperature due to good heat transfer.
   C. Increase of performance and quality.
4. A steam ejector on a double jacqueted reactor increases heat transfer of up to 10-15% and quarantes good heat transfer as well in the bottom area.
5. The steam ejector allows to heat several heat consumers in parallel with only one steam trap.

By applying this technology, Baelz can sell:
- steam ejectors with electric or pneumatic actuator
- controllers and sensors to control these ejectors

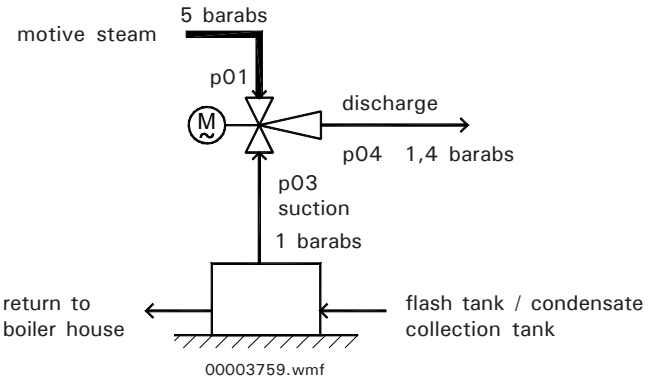

Fig. 10 Example 1: vapour recompression

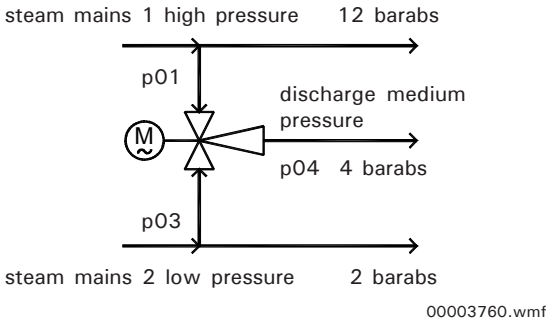

Fig. 11 Example 2: steam conditioning

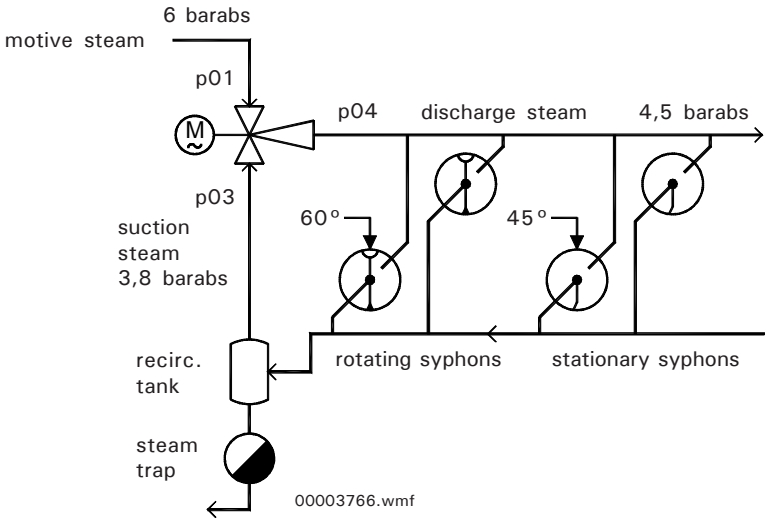

Fig. 12 Example 3: recirculation and suction of steam and condensate

Bälz-vapordynamic - controllable nozzle ejectors steam/steam

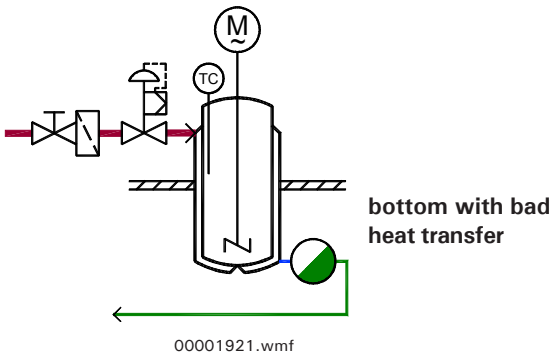

Fig. 13
Example 4.1: conventional double jacqueted reactor with steam-side control valve

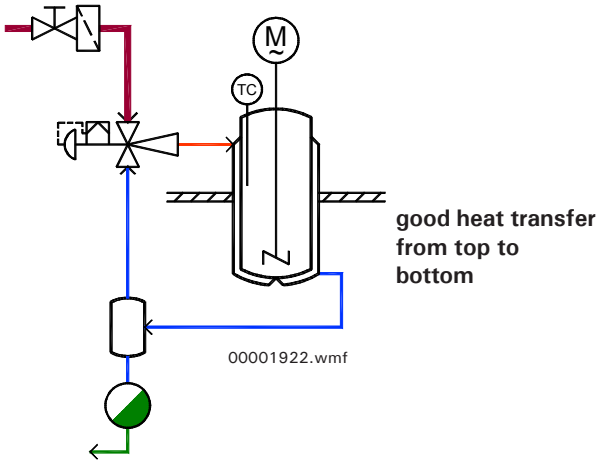

Fig. 14
Example 4.2: double jacqueted reactor with recirculation steam ejector to assure equal heating from top to bottom

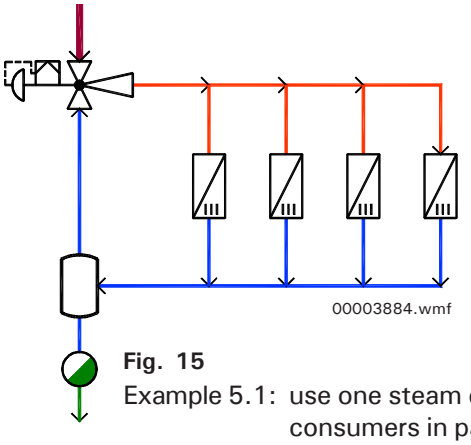

Fig. 15
Example 5.1: use one steam ejector to control several heat consumers in parallel with only 1 steam trap; save 3 steam traps

conventional design
- 6 control valves
- 7 steam traps

design with ejectors
- 2 ejectors
- 2 steam traps

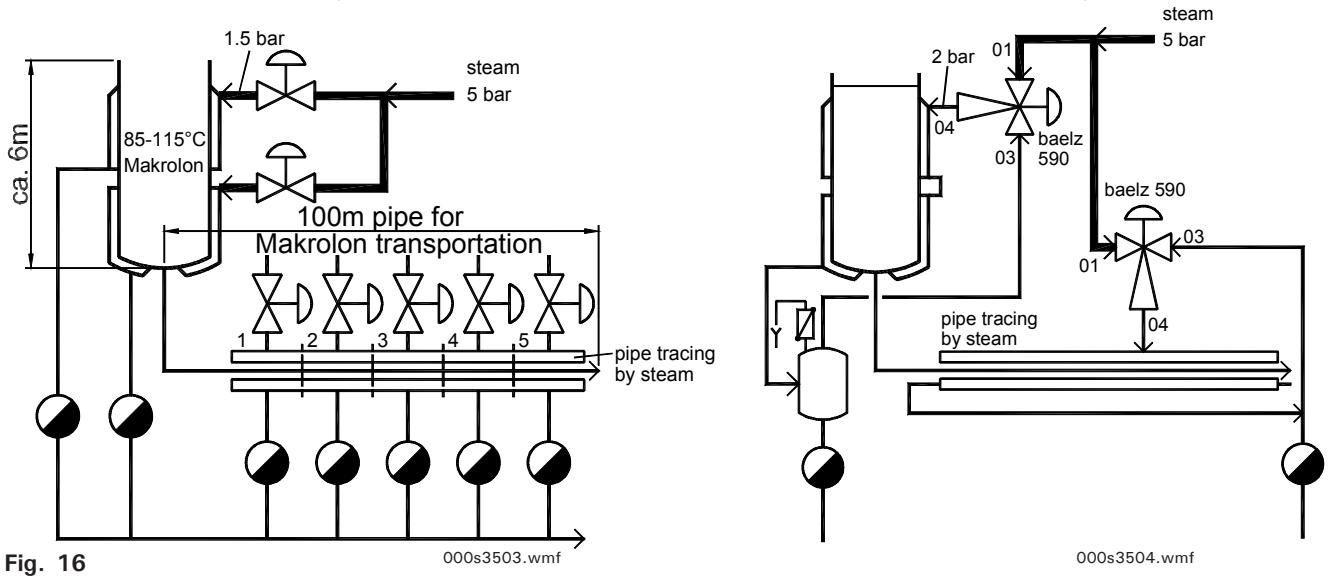

Fig. 16
Example 5.2: reduce number of control valve posts on steam tracing by using steam ejectors; save valves and steam traps

Bälz-vapordynamic - steam conditioner with water injection

Steam conditioner baelz 591 or steam desuperheater baelz 591 with internal recirculation

Checklist:
ND: 32 - 300
NP: 16 / 25 / 40
standard body:
NP 16 + NP 25:
GJS-400-18-LT (GGG 40.3)
NP 40: GP240GH (GS-C25)
temperatures:
min.: -10°C
max.: +240°C or
+350°C type K
ND 32 - 125 tube-spindle Ø: 16 mm
ND 150 tube-spindle Ø: 22 mm
ND 200 - 300 tube-spindle Ø: 36 mm

ND	32	40	50	65
nozzle	12	28	39	50
ND	80	100	125	150
nozzle	62	82	105	105

Short presentation of all electric and pneumatic actuators see BPE 18

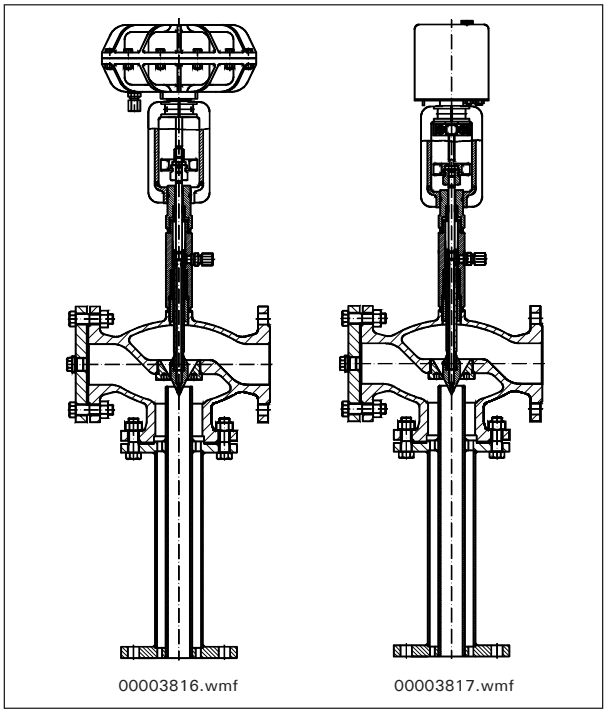

Fig. 17
baelz 591-373-P21 baelz 591-373-E07

Text for quotations + orders:

steam conditioner/desuperheater with water injection
without actuator
body material
NP 16 + NP 25 : GJS-400-18-LT (GGG 40.3)
NP 40 : GP240GH (GS-C25)
diffuser material
NP 16 / 25 / 40 : GJS-400-18-LT (GGG 40.3)
with welded diffuser, throat in stainless steel
nozzle, plug and spindle : stainless steel
stuffing box : V-rings in PTFE
temp./pressure
NP 16:max. 240°C/11 bar or max. 120°C/16 bar
NP 25:max. 240°C/18 bar or max. 120°C/25 bar
NP 40:max. 240°C/32 bar or max. 120°C/40 bar
stroke : ND 32 -125 : 22 / 40 mm
ND 150 : 44 mm
ND 200 - 300 : 66 mm


591-DN50-P21-IP86.JPG

Fig. 18
baelz 591-373-P21

Service conditions:

	01 primary	04 secondary	02 water injection	dB (A)
pressure [bar abs]				
temperature [°C]				
flow [kg/h] m				

max. closing pressure
Δp_0 : ..... bar

Bälz-vapordynamic - steam conditioner with water injection

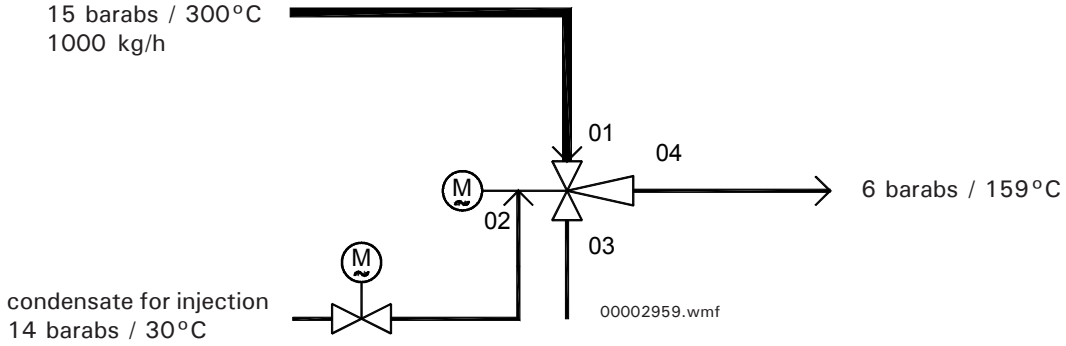

Fig. 19 General pressure reduction and desuperheating example

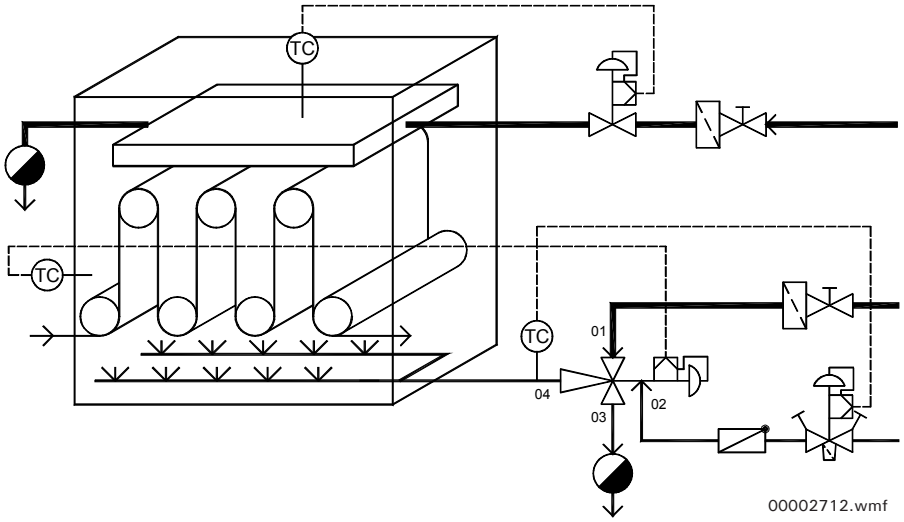

Fig. 20 Textile steamer with steam conditioner baelz 591 to create saturated steam atmosphere and ceiling heating to avoid condensed water droplets

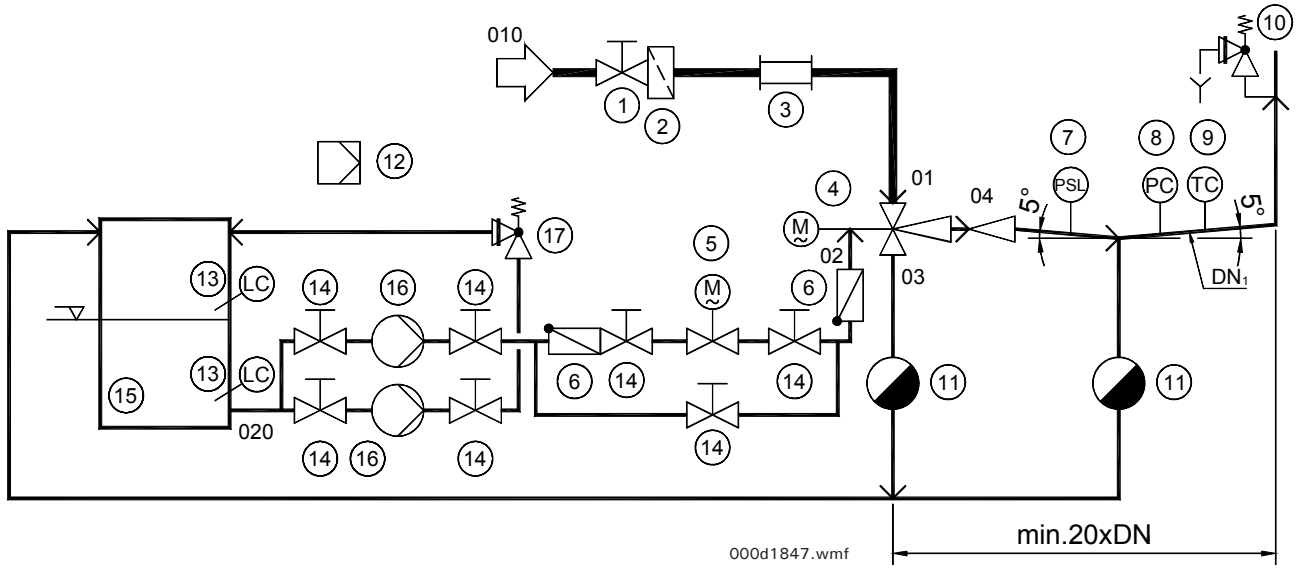

Fig. 21 Desuperheater / steam conditioner with condensate tank for water injection

Bälz-vapordynamic - steam conditioner with water injection

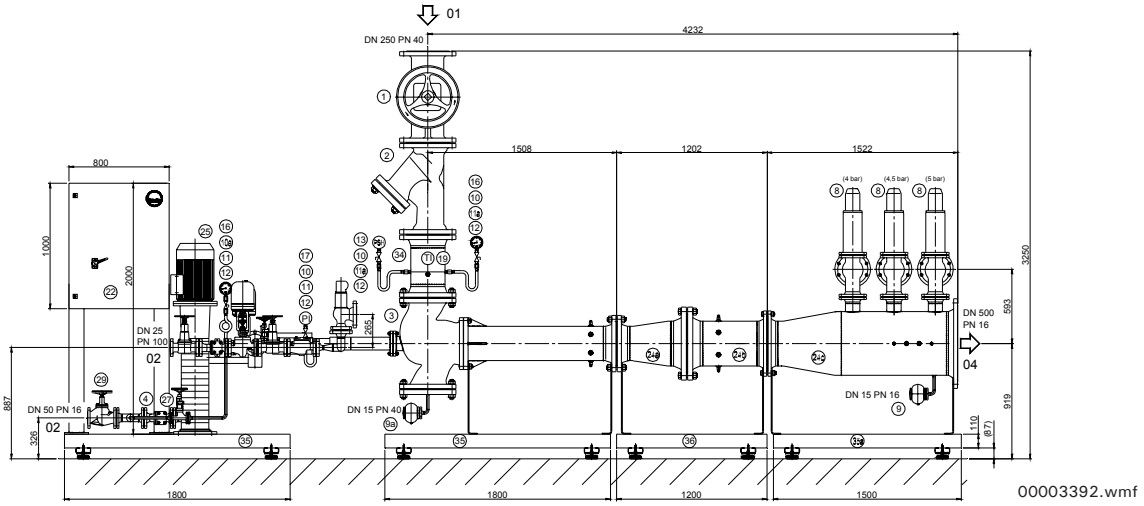

Fig. 22 Pressure reduction steam desuperheating and noise reduction in a pharmaceutical plant
inlet: p01 = 17 barabs T01 = 280°C
outlet: p04 = 2,6 barabs T04 = 170°C
flow: m04 = 4-40 t/h

Fig. 23 Photo of the unit shown in Fig. 22

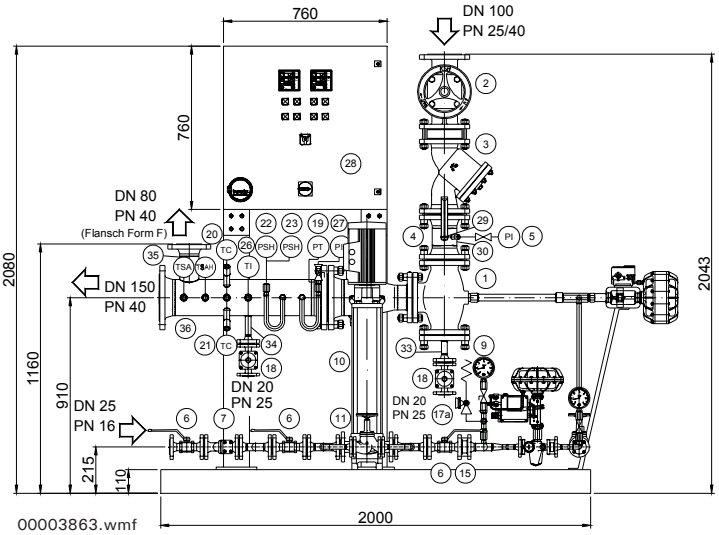

Fig. 24 Packaged unit of a pressure reduction and steam desuperheating station
inlet: p01 = 13 barabs T01 = 300°C
outlet: p04 = 6 barabs T04 = 170°C
flow: m04 = 400-5000 kg/h

Fig. 25 Photo of the packaged unit of Fig. 24