

Multi-stage steam jet vacuum pumps

in metal construction with surface condensers

DESIGN AND MODE OF OPERATION

FOUR-STAGE STEAM JET VACUUM PUMP WITH SURFACE CONDENSER FOR 1 mbar (FIG. 1)

STAGE 1: extracts the vapours and gases from the process to be kept under vacuum; final vacuum e.g. 2 mbar

STAGE 2: compresses both the motive steam and the extracted vapours and gases discharged by the 1st pump stage to a pressure of 80 mbar

SURFACE CONDENSER I: is designed for a condensation pressure level which is as low as possible to keep the steam consumption as low as possible. The suction flow load of the downstream-arranged stages and their steam requirements are thereby reduced.

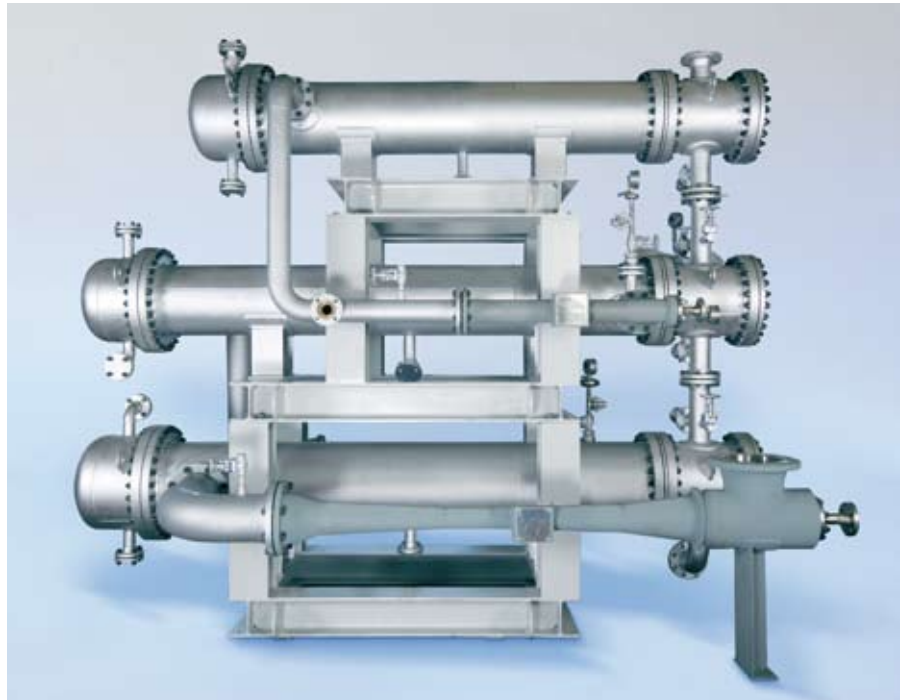
STAGE 3: stage extracts all gases and vapours which were not condensed in the surface condenser I for compression to a pressure of 320 mbar

SURFACE CONDENSER II: reduces the suction flow in order to relieve the downstream arranged stages

STAGE 4: compresses to atmospheric pressure for discharge to the ambient air via a scrubber or a surface condenser

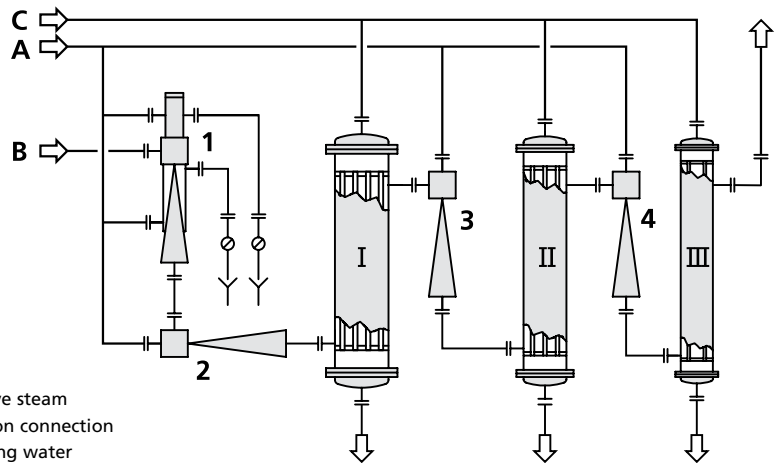
SURFACE CONDENSER III: condenses the remaining suction flow and the motive steam of the upstream arranged stage

See also "Planning a steam jet vacuum pump", 71 gdp3.



3-stage steam jet vacuum pump downstream of the 1st stage (pre-stage, heated), suction capacity: 3462 kg/h from 26.7 mbar abs.

FIG. 1



- A Motive steam
- B Suction connection
- C Cooling water

- 1-4 Steam jet vacuum pumps, stages 1 to 4
- I-III Surface condenser

4-stage steam jet vacuum pump with surface condensers

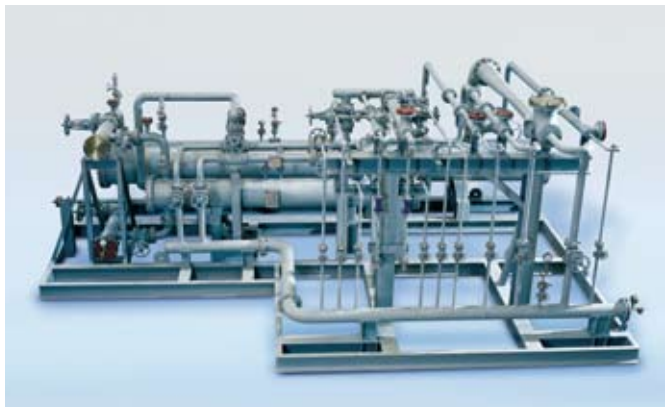


Fig. 2
3-stage steam jet vacuum pump with several lateral flows (10 jet pumps in total) for the production of mono-ethylene glycole (plastics industries)
Total suction flow: approx. 1050 kg from different pressure levels



Fig. 3
2-stage steam jet vacuum pump with surface condenser, completely in Hastelloy
Suction capacity: 110 kg/h from 35 mbar



Fig. 4
3-stage steam jet vacuum pump with surface condenser for the vacuum column of a refinery
Suction flow: 13 180 kg/h (436 000 m³/h)
Suction pressure abs.: 4.5 kPa abs.
Discharge pressure abs.: 110 kPa abs.