



Subject to modifications.

Ejectors and Vacuum Systems

Decades of experience in development and design of ejectors and vacuum systems

Ejectors, also referred to as jet pumps, are devices for conveying, compressing, heating or mixing gases, vapors, liquids or solids in which a gaseous or liquid medium serves as the motive force.

They operate by the conversion of pressure energy into velocity in suitable nozzles. They are “pumps without moving parts”.

Ejectors form the core of steam jet vacuum pumps, steam jet cooling systems and heating/cooling units. GEA jet vacuum systems essentially consist of combinations of ejectors and condensers. They are used to create and maintain the vacuum in evaporators, driers, in distillation and rectification plants, and in the processes of freeze drying, polycondensation, degassing and deodorizing.

Special features

- Simple design
- Reliable in operation
- Long equipment life
- No moving parts
- Low wear and tear and minimum maintenance
- Can be used for suction flow rates of 10 m³/h to 2,000,000 m³/h
- Suitable for vacuum up to 0.01 mbar (abs.)
- Use of product vapor as motive medium
- Jet vacuum pumps can be combined with mechanical vacuum pumps (hybrid systems)
- Available in a variety of materials, e.g. stainless steel, cast iron, Hastelloy, titanium, graphite, PVC, PTFE, PP

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Working principle

The basic principle of ejectors consists in the liquid or gas jet being emitted by a nozzle at high-speed entraining and accelerating the surrounding liquid, gas or solid matter.

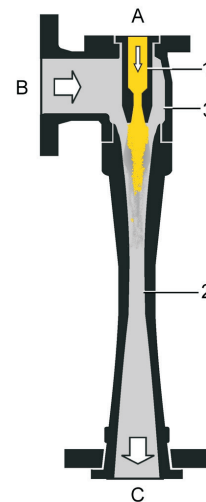
The result of this action is a mixture of the motive and entrained (sucked) fluids, the velocity of which is reduced and the pressure increased in a second nozzle. The pressures at the connections and the corresponding mass flow rates determine the functional effect of a jet pump.

An ejector consists of three main parts:

- 1 motive nozzle
- 2 diffuser
- 3 head

and is provided with at least three connections:

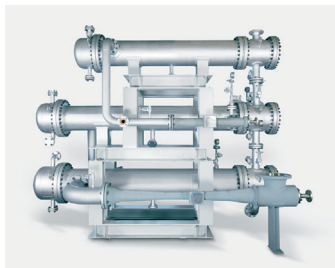
- A motive medium inlet connection
- B suction manifold
- C pressure manifold



GEA portfolio

Three-stage steam jet vacuum pump with surface condenser downstream of the 1st stage for the chemical industry.

Suction capacity: 3,462 kg/h from 26.7 mbar



Jet mixer system in a crude oil tank. With jet mixers, a three-dimensional flow is achieved in the tank without producing a rotating motion.



Two-stage steam jet liquid ring vacuum pump with surface condenser for the vacuum column of a refinery.

Suction flow rate:
6,198 kg/h (689,337 m³/h)
from 8 mbar



Thermocompressor with variable flow for a multi-effect distillation unit for a seawater desalination plant with a capacity of 800 t/h of distillate.

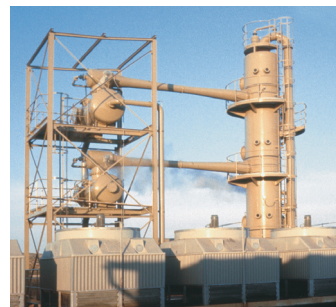


Ejector for a four-stage steam jet vacuum system for steel degassing.

Suction flow rate:
1,100 kg/h (1,387,000 m³/h)
from 0.6 mbar.



Three-stage steam jet cooling plant in bridge design. Cooling of 194 m³/h of water from 28 °C to 1 °C. Refrigeration capacity: 2,900 kW



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