

STEAM JET VACUUM EJECTORS GED TYPE

Suction and compression of vapor and gas



Steam jet ejectors generate vacuum by exploiting the kinetic energy of the motive steam.

The principle is based on the Venturi effect:

High-pressure steam is expanded through a converging–diverging nozzle, increasing its velocity.

The high-velocity jet creates a low-pressure zone that enables the suction of gases or vapors from the system to be evacuated.

The mixture of steam and aspirated gases enters the mixing chamber and then the diffuser, where kinetic energy is reconverted into pressure.

This process leads to the compression of the aspirated gases to a higher discharge pressure, allowing their disposal or subsequent condensation.

Depending on the required vacuum level, multiple stages may be installed with barometric or surface condensers between stages.

Operation

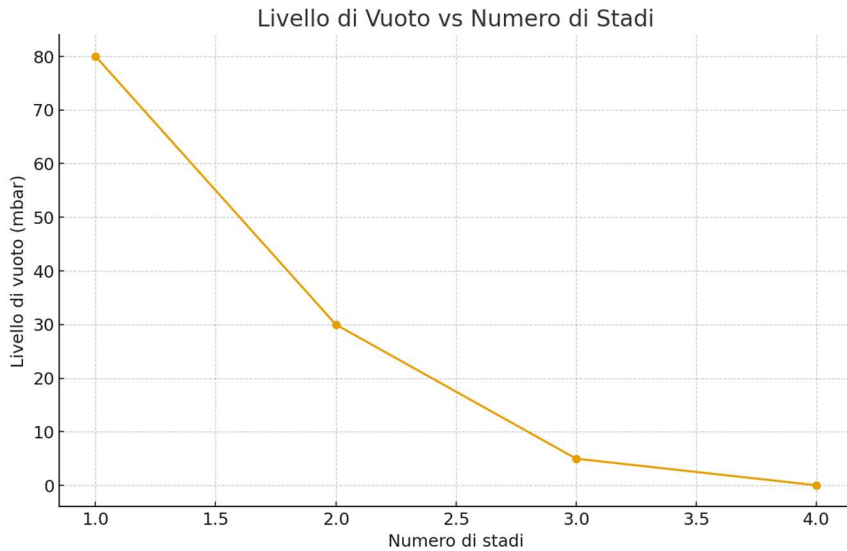
The operation of steam ejectors is characterized by:

- No moving mechanical parts, resulting in high reliability.
- Immediate start-up, depending solely on the availability of motive steam.
- Ability to operate with variable gas flow rates without compromising stability.
- Capability to handle non-condensable gases, saturated vapors, traces of liquids, and contaminants.
- The ejector's performances are influenced by: pressure and quality of the motive steam (dry, superheated, or saturated), cooling water temperature in condensers, motive nozzle and diffuser configuration, properties of the processed gases and vapors.



The ejectors can be configured as:

- Single-stage, for moderate vacuum levels;
- Multi-stage, for deep vacuum (down to 0.1–0.01 mbar absolute, depending on design).



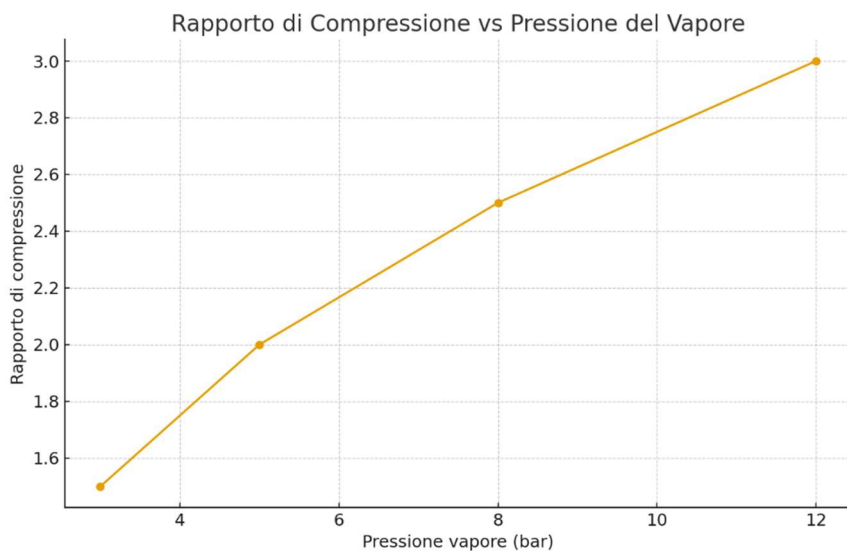
The compression ratio and suction ratio are two fundamental parameters for understanding the operation and performance of a steam vacuum ejector.

The compression ratio of an ejector is defined as:

Compression ratio = P outlet / P inlet

- P inlet is the pressure of the aspirated gas/steam
- P outlet is the pressure of the steam/gas mixture exiting the ejector

The graph below shows typical compression ratio values.



The suction ratio is the ejector's ability to remove gases and vapors from the system to bring it to the desired vacuum level in relation to the amount of motive steam used.

It depends primarily on the ratio between the pressures of the motive steam, the aspirated fluid, and the exhaust mixture.

In the case of multi-stage vacuum systems, the temperature of the condenser cooling fluid plays a significant role.

Increasing the compression ratio generally reduces the suction flow rate and vice versa.

For this reason, more stages are used to achieve higher vacuums.

Contact our technical office to define in detail the performance of the ejector best suited to your application..

Areas of applications



Steam ejectors are widely used in industrial sectors where a stable and continuous vacuum is required.

The main applications include:

- **Chemical industry**
Vacuum distillation, stripping, drying, crystallization
- **Petrochemical and refining**
Vacuum systems for distillation columns (VGO, vacuum towers)
- **Pharmaceutical production**
Concentration and evaporation of heat-sensitive solutions
- **Food industry**
Juice concentration, evaporation, deodorization of vegetable oils.
- **Energy and thermal plants**
Degassing, facilitated condensation, desalination plants
- **General applications**
Dryers, process chambers, autoclaves.