General Information on Jet Pumps

Jet pumps are devices for the conveyance, compression or mixing of gases, vapours, 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."

Information on jet pumps can be found in DIN-Blatt 24 290. Jet pumps are named after the motive side as well as the suction side. The table below (fig. 3) stems from this DIN-Blatt and gives all the usual designations, to which the standard of this catalogue corresponds.

The basic principle of jet pumps consists in the liquid or gas jet emitted by the motive nozzle at higher velocities entraining and accelerating the surrounding gas or liquid. The result of this action is a mixture of the driving and entrained fluids, the velocity of which is reduced and the pressure increased in a second nozzle.

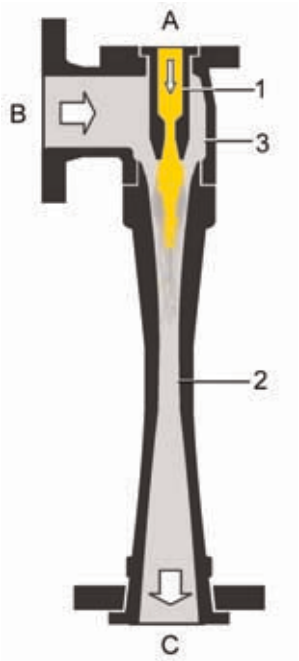

Fig. 1

The practical application of this principle requires a simple apparatus, which normally consists of only 3 main parts:

- motive nozzle (1)
- diffusor (2)
- head (3)

The flow channel of the diffusor consists of a part converging in the direction of the flow (the inlet cone), a cylindrical piece (the throat) and a diverging part (the outlet cone).

The pressures at the connections and the mass flows determine the effect of a jet pump.

There are 3 external connections:

- motive medium inlet connection (A)
- suction connection (B)
- pressure outlet connection (C)

designated as:

p_1 The pressure before the motive nozzle = motive medium pressure

p_0 The pressure at the suction connection = suction pressure

p The pressure at the outlet connection = counter pressure

The mass flows called $\dot{M}_1$, $\dot{M}_0$ and $\dot{M}$ for the in and out flowing media are measured in kg/hr.

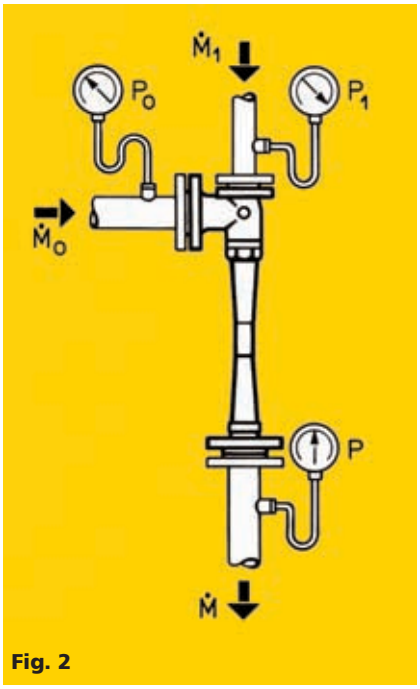

Fig. 2

Therefore, $\dot{M}_1 + \dot{M}_0$ must always equal $\dot{M}$, as what flows in must also flow out again.

For the relationship between the various pressures, no simple rule can be applied. The internal reactions are complex and only in a limited way accessible by calculation.

Jet pumps of **GEA Jet Pumps** are constructed on the basis of many years of experience and research in such a way that very good practical characteristics are combined with optimum efficiency.

according to the motive side / according to the suction side	**Gas Jet Pump**	**Steam Jet Pump**	**Liquid Jet Pump**
jet ventilator	gas jet ventilator	steam jet ventilator	liquid jet ventilator
jet compressor	gas jet compressor	steam jet compressor (steam jet thermo compressor)	liquid jet compressor
jet vacuum pump	gas jet vacuum pump	steam jet vacuum pump	liquid jet vacuum pump
jet liquid pump	gas jet liquid pump	steam jet liquid pump (injector)	liquid jet liquid pump
jet solid pump	gas jet solid pump	steam jet solids pump	liquid jet solids pump
The description of the individual parts of a jet pump is according to the DIN 24 291 standard			

Fig. 3 General description of jet pumps according to DIN 24 290

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Wiegand Technology

General Information on Jet Pumps

The programme of the Jet Pump department of GEA Jet Pumps is divided into two main fields:

1) Supply of Standard Apparatus

This catalogue gives a wide selection. The types and sizes are so chosen that for normal duties, a suitable unit can always be found. Description and capacity curves and the corresponding sheets allow the correct choice.

2) Design, Construction and Supply of Special Apparatus and Plants

For this purpose our well-trained staff of specialists in jet pumps and vacuum systems is available. In our modern Research Laboratory, the required investigations, research work and tests are carried out. Special leaflets give detailed information; they show the general principles of these plants and give what information is needed in the projection and preparation of a quotation.

Jet pumps can be built for very small as well as for extraordinarily large capacities. They can be constructed from the most varied materials and are distinguished by:

- Reliability
- Simplicity
- Low maintenance costs
- Low capital expenditure

What has to be borne in mind ?

- **When purchasing jet pumps according to the catalogue:**

The capacities given in the catalogue sheets are only guide values and change if operating conditions differ.

For the construction in individual cases, our order confirmation is binding and not the catalogue sheet.

Where necessary, erection and operating instructions are made available.

Normally, cast apparatus is supplied with flanges bored to DIN PN 10, unless otherwise agreed. If specified, flanges according to ANSI, BS or other special flanges can be supplied, if the casting model is available or if it is a question of welded (fabricated) apparatus. Counter flanges together with seals and screws are only supplied on request.

Our General Sales Conditions are valid for all supplies.

- **When installing jet pumps:**

Do not mix up the connections.

Connecting pipe lines must be of equal or longer diameter than the corresponding connections on the plant.

Valves, cocks, seals etc., must have the full cross sectional area and not restrict the line.

For longer pipe lines, the cross sectional area must be larger to obtain the lowest possible pressure loss. In all cases, care must be taken to ensure that the pipe line be constructed with the most favourable flow characteristics.

Steam lines should be well insulated. Dry motive steam is particularly important for the good operation of steam jet vacuum pumps.

Before the first start-up the lines should be blasted with steam or compressed air, as rust, dirt and weld splatter can easily block the small bore of the motive nozzles.

Furthermore, we recommend the installation of a dirt trap in the line before the motive nozzle.

Further details on the assembly and operation of jet pumps are given in the respective operation instructions.