

Liquid Jet Solid Pumps

These devices operate on the ejector principle and serve to convey liquids with particles and flow able granular material. The motive liquid, in most cases water, emerges from the motive nozzle at a high velocity into the mixing chamber of the pump, entraining the material present in the mixing chamber. At the suction connection a feeding hopper for the solids is installed. Depending upon the type of material to be conveyed, rinse water must be sprayed into the hopper in order to maintain a constant flow.



Advantages

- Simple and reliable
- Corrosion and erosion resistant
- Automatic control
- Easy to install
- Low cost
- No moving parts
- Practically no maintenance during its service if “washed down” periodically

Applications

- Convey granular solids, sand, gravel, salt, activated carbon, ion-exchange resin, absorbent carbon, chemical or pharmaceutical substances, ash, drilling mud, semisolids such as crushable foodstuff and other types of solids
- Filling and emptying reactors with reactor mass
- Adding additives to reactors
- Decarburizing and de-acidifying plants of water and effluent treatment plants
- Adding precipitating agents in dirty water and effluent water treatment
- Filling, cleaning and discharging water treatment plants
- Agricultural purposes
- Producing emulsions
- Pumping food products
- Glass industry and power production

Range of Operation

- Maximum allowable grain diameter 8 mm

In normal operation (smooth surface grains of maximum 1.0-1.5 mm diameter without "bridging" tendency)

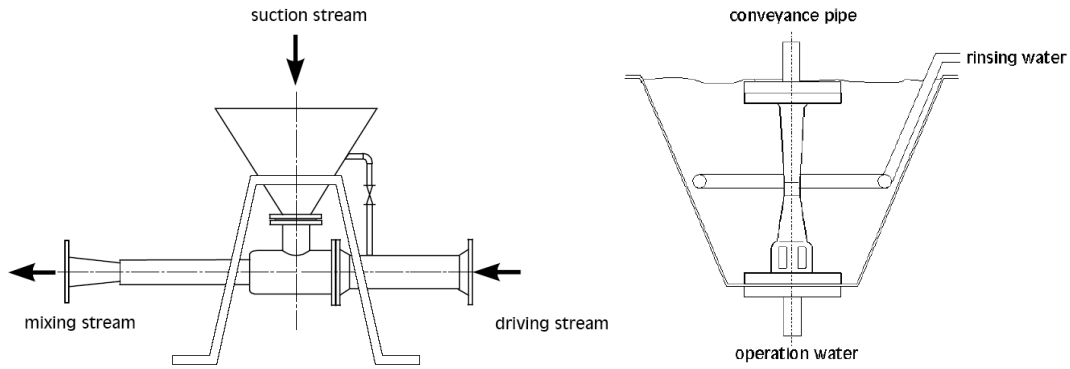
- Motive volume: 3 – 5 times the volume of the material to be conveyed
- Motive pressure: 2.5 - 3 times that of the delivery head.
- Rinse water: 20% the volume of the material to be conveyed

In more difficult cases (coarser materials with a rougher surface, relatively high specific gravity, tendency to form "bridges" and to bond, such as sand, ash, and sticky slurries)

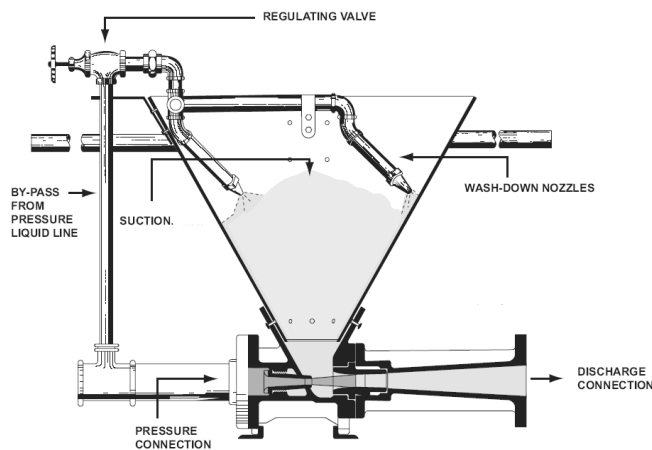
- Motive volume: 5 - 10 times the volume of the material to be conveyed
- Motive pressure: 2.5 - 3 times that of the delivery head.
- Rinse water: included in motive volume consumption

Installation Requirements

- At the suction connection a feeding hopper for the solids is installed or the water jet pump has to be installed in a hopper.

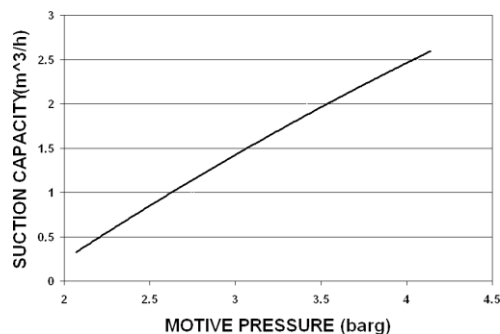


- The solids are fed to the water jet pump continuously assisted by rinsing water which also prevents entrainment of excess air and increases the capacity about 3 times.
- For bad flow able solids an additional liquid rinsing device is installed inside the hopper.
- The connection pipes have to be at least of the same size as the connections of the water jet pump.
- The pumps have to be started against pressure. Therefore, it is recommended to install a throttle-valve after the water jet pump.
- The cleaning of the water jet pump is effectuated by closing the throttle-valve after the pump. The driving water flows through the suction inlets and removes impurities.



Performance graphs

The diagram below shows the suction capacity of the 1 ½" size ejector in terms of water pressure.



In higher capacities, the following table can be used.

size	1 ½"	2"	3"	4"	6"
ratio	2	1.6	3.5	6	18

Using the following diagram, it is also possible to determine the ratio of water component to the mass of solid material in terms of driving water pressure. In other words, the required amount of water can be determined according to its pressure.

