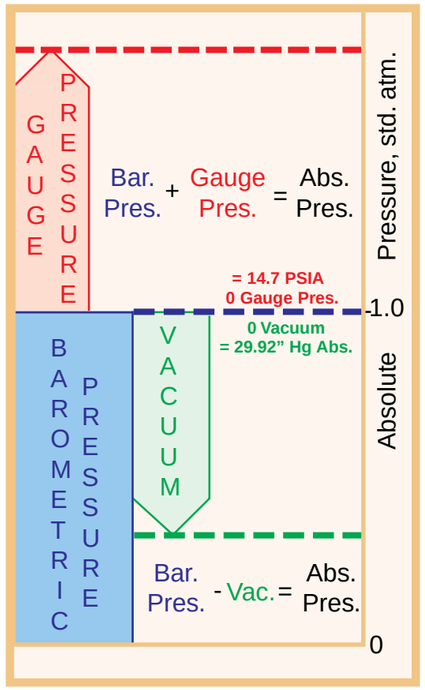
# Jet-Vac®

Practical Engineering Information





Ejectors can use process vapors instead of steam as the motivating fluid. Gas compression (shown here) and steam desuperheating are other applications.

1.0 Standard Atmosphere (Std. Atm.) is equivalent to

| | |
|---|---|
| | 14.7 psi |
| or | 33.9 ft of $H_2O$ |
| or | 29.921 in of Hg |
| or | 760 mm of Hg |
| or | 1.0332 kg/cm$^2$ |
| or | 101.325 Kilopascals (Kpa) |
| or | 1.01325 Bars |

**Example Conversion**

Convert 7.0 psi to Bars:

$$7.0\ \text{psi} \times \frac{1.01325\ \text{Bars}}{14.7\ \text{psi}} = 0.48\ \text{Bars}$$

| # of Stages | Operating Suction Press. (Hg Abs.) | Closed Test Suction Press. (Hg Abs.) |
|---|---|---|
| 1 | 3" and up | 1½"-2" |
| 2 | 10 mm - 4" | 5 mm |
| 3 | 2 -15 mm | 1 mm |
| 4 | 0.25 - 3 mm | 50 - 100 microns |
| 5 | 0.3 mm and less | 5 - 10 microns |

Suction or Steam Line Sizing

$$d = \sqrt{\frac{0.051 \times W \times \upsilon}{V}}$$

d = pipe i.d., inches
W = total flow, lb/hr
$\upsilon$ = specific volume, cu. ft./lb.
V = velocity (typically 200 ft./sec.)


Talk to the people at **Jet - Vac®**

For all steam jet and hybrid *ejector* systems

CALL 781-893-6800

e-mail: jetvac@artisanind.com

(FAX) 781-647-0143 www.artisanind.com

73 Pond Street Waltham, MA 02451-4594



Bulletin 9902R302

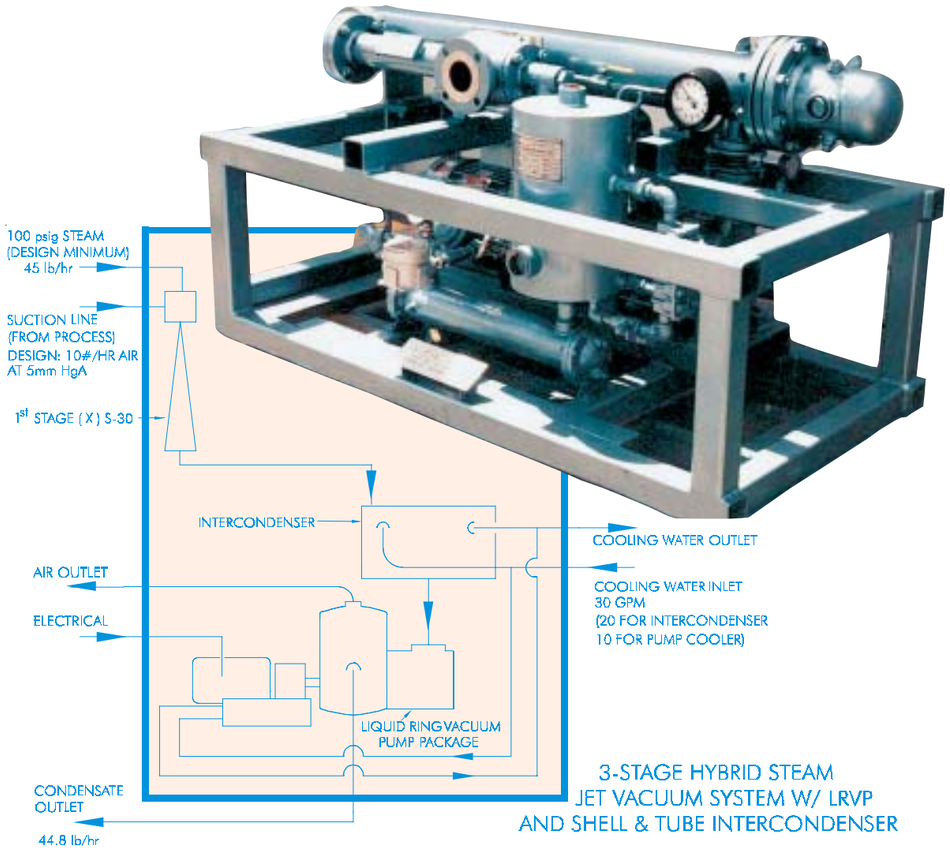

ARTISAN

ARTISAN INDUSTRIES INC.

# Jet-Vac®

**thinks you should know:**

## How to obtain the *most reliable vacuum* at the lowest capital and operating costs.




3-STAGE HYBRID STEAM JET VACUUM SYSTEM W/ LRVP AND SHELL & TUBE INTERCONDENSER

A guide to

## Jet-Vac steam jet ejectors

a proven technology
a proven supplier

## Reliable and Proven Technology

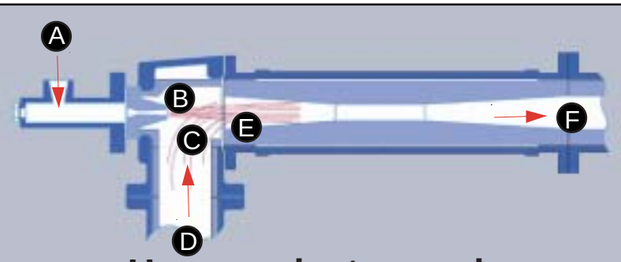
### Single and Multi-stage ejector systems

- No moving parts
- Simple, quiet, compact
- Needs only process, utility & structural connections
- Nearly maintenance free
- No lubricating oil

**Only Jet-Vac** manufactures interchangeable components in all materials of construction - allows retrofitting in corrosive environments.

**Hybrid Systems** - with liquid ring pump final stages

- Ideal for low level installations
- Reduced steam consumption
- Compact, modular package




### How an ejector works

**A** Steam is fed at high pressure and relatively low velocity into the motive fluid connection

**B** Steam expands through the ejector nozzle and changes into a high velocity and low pressure stream. If lower than atmospheric pressure, a vacuum is created.

**C** A low absolute pressure attracts the fluid **D** to be pumped from the process connection.

**E** Momentum is transferred between fluids, raising the pressure of the fluid being pumped.

**F** The mixture of fluids then discharges to the atmosphere (or the next ejector in multi-stage designs).

## Reliable and Proven Manufacturing

### Jet-Vac provides:

- Complete system responsibility
- Complete vacuum packages including controls
- Professional and timely support during inquiry, proposal, engineering, manufacturing and start-up
- Modern, full function testing facilities
- Custom engineering with state-of-the-art computer analysis
- Fabrication to ASME Code, ANSI B31.3, B31.1, TEMA and HEI standards
- Shell and tube or direct contact condensers
- Steel, cast iron, stainless steel, hastelloy®, titanium, or graphite lined

**Right: Jet-Vac 2100 ton three stage water chilling system**

**Three Stage Hybrid System**

**Three Stage Ejector Packaged System**

**Left: (foreground) Jet-Vac® hybrid vacuum system providing vacuum to Artisan Rototherm® thin film evaporator (background) that produces a free flowing powder.**

### Consider all steam jet and hybrid ejector systems

**For:**
Evaporation
Stripping
Refrigeration
Filtration
Distillation
Crystallization
Drying
Degassing

**With:**
Reliability
Low capital cost
Corrosion resistance
Minimal air pollution
Any size load
Low temperature operation

### Optimum steam jet system design requires the following information:

- Absolute suction pressure and temperature
- Gas and vapor flow (lb./ hour of each component in the process load)
- Maximum discharge pressure
- Maximum condensing water temperature (through-out the year)
- Minimum available steam pressure and temperature
- Materials of construction

### Jet-Vac serves these industries

- Chemical
- Petrochemical
- Pharmaceutical
- Food
- Power