

Title:
Blowers

Word Count:
1387

Summary:
Manufacturers, suppliers and exporters of blowers and boosters like air blowers, gas blowers,

Keywords:
air blowers, gas blowers, water cooled blowers, aqua series blowers, expo series blowers, dry

Article Body:
MECHANICAL VACUUM BOOSTERS:-

Mechanical Vacuum Boosters are dry pumps that meet most of the ideal vacuum pump requirements.

The major advantages are:-

- (a) Can be integrated with any installed vacuum system such as Steam Ejectors, Water Ring Pump
 - (b) The vacuum booster is a Dry Pump as it does not use any pumping fluid. It pumps vapor or g
 - (c) Vacuum boosters are power efficient. Very often a combination of Vacuum Booster and suitab
 - (d) Boosters increase the working vacuum of the process, in most cases very essential for prod performance and efficiency. Vacuum Booster can be used over a wide working pressure range, from 100 Torr down to 0.001 Torr (mm of mercury), with suitable arrangement of backup pumps.
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- (e) It has very low pump friction losses, hence requires relatively low power for high volumet speeds. Typically, their speeds, at low vacuums are 20-30 times higher than corresponding vane pumps / ring pumps of equivalent power.
 - (f) Use of electronic control devices such as Variable Frequency Control Drive allow to modify vacuum boosters operating characteristics to conform to the operational requirements of the pr vacuum pumps. Hence they can be easily integrated into all existing pumping set up to boost th performance.
 - (g) Vacuum boosters don't have any valves, rings, stuffing box etc., therefore, do not demand
 - (h) Due to vapor compression action by the booster, the pressure at the discharge of booster (

The Table below gives a rough estimate of how the boosters enhance the working vacuums of the However, the final vacuum is governed by the suitable selection of the backing pump and booste arrangement. The table below gives a broad range of vacuum achieved with various backing pumps

Vacuum Pump	Expected vacuum	Vacuum on installation	Range of Booster (single stage)
Single Stage Ejector	150 Torr	15 - 30 Torr	
Water Ejector	100 Torr	10 - 20 Torr	
Water Ring Pump	40 - 60 Torr	5 - 10 Torr	
Liquid Ring Pump	20 - 30 Torr	2 - 5 Torr	
Piston Pumps	20 - 30 Torr	2 - 5 Torr	
Rotary Piston Pumps	0.1 Torr	0.01 Torr	
Rotary Vane Oil Pump	0.01 - 0.001 Torr	0.001 - 0.0001 Torr.	

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For example, if a process is using water ring Pump, the estimated working vacuums would be of

Typical Booster Installation

- (1) Evaporator
- (2) Gauge
- (3) Condenser
- (4) Mechanical Booster
- (5) backup Pump

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Calculating the Pump Capacity: -

Based on the fundamental gas laws $PV = RT$, an expression can be derived for Volumetric Flow Rate

$$V = R \cdot T_{\text{gas}} / P \left(Q_1/M_1 + Q_2/M_2 + \dots + Q_n/M_n \right)$$

Where V = Inlet Volume flow rate m³/hr.

R = Universal gas Constant, 83.14 mbar m³/ Kgmol x °K

T_{gas} = Gas/Vapor abs. Temp, in °K

P = Process Absolute Pressure in mbar

Q₁, Q₂, Q₃ = Gas / Vapor flow rate, in Kg/hr.

M₁, M₂, M₃ = Molar mass, in Kg/mol. of gas /vapor.

Booster Operation:

Power Constraints restrict the total differential pressures across the booster. This demands t

- 1.) Manual method:- Initially the fore pump is switched on until the required cut in pressure
- 2.) Auto method:- Installation of mechanical By-pass arrangement across the booster or hydro k

Advantages of using Electronic Variable Speed Control Device

Electronic A.C Variable Frequency Control Drives are most preferred devices used to regulate t
Booster speed to match the varying load conditions of the process. These drives enhance the ov

The major advantages are: -

1. Booster can be started directly from atmosphere.
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2. No need for separate pressure switch, by pass line or offloading valves.
3. Considerable savings in power.
4. Prevents over-heating of Boosters.
5. Protects the Booster against overload and excessive pressures.
6. Offers complete protection to motor against over voltage, under voltage, over current, Over-heating, ground fault.
7. Eliminates the needs of separate starter and overload relays for the Motor.
8. Automatically adjusts the speed of Booster between low and high range set giving high pumping speeds with relatively low input power.

The Electronic Variable Frequency Control Drive is a microprocessor based electronic drive whi
External computer control over all aspects of booster performance is possible via RS485 serial

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