



# Chemical Injection Technologies

## Product/Specification Bulletin

### SUPERIOR VacuFeed-X™ All-Vacuum Liquid Chemical Feed System (U.S. Patent No. 7,032,609 )

#### GENERAL DESCRIPTION

The SUPERIOR VacuFeed-X™ is a state-of-the-art Liquid Chemical Feed System designed to allow constant, consistently repeatable metering of liquids into water or waste water treatment systems, swimming pools, and many industrial processes. A highly efficient, water operated venturi type ejector produces the vacuum necessary to operate the system. A unique "Triple Bypass" check valve system prevents pressurized water from entering the liquid metering system and provides a visual pressure relief to drain. All components operate under a safe, vacuum condition which prevents chemicals from continuing to feed into the atmosphere in the event of a breakage. A precision liquid flow meter panel indicates the amount of liquid being fed. Liquid flow rate is manually adjusted and the design permits easy addition of an automatic flow rate control valve. A spring opposed diaphragm vacuum regulator controls the liquid flow rate and also acts as a safety shut-off valve which prevents any backflow of water or chemicals into the chemical storage tank. VacuFeed's standard models are designed to feed either Sodium Hypochlorite (bleach) and Calcium Hypochlorite (granular chlorine) solutions, or Aqueous Ammonia. Other chemicals may be compatible with the standard materials of construction.

#### FEATURES

The SUPERIOR VacuFeed-X™ system represents the most modern design technology coupled with the very best materials available to create an outstanding, user friendly piece of equipment. It is designed with user safety as a primary concern.

1. VacuFeed is self priming and will not lose prime, even with negative inlet head pressures.
2. Design eliminates any possibility of "air binding" when gasses enter the system, or "out-gassing" occurs. This is particularly important when feeding Sodium Hypochlorite (bleach).
3. VacuFeed maintains a consistent, high-accuracy liquid feed rate.
4. Feed rate is repeatable in start-stop operations.
5. There are no moving parts, which translates into low maintenance, easy service, low down time, and low operating cost.
6. VacuFeed systems are easy to service and maintain with no special tools required.
7. Safe. Will not continue to feed chemicals into the atmosphere in the event of a break or leak in tubing or other component.
8. "Triple Bypass" check valve system has a positive pressure relief to drain, virtually eliminating any possibility of backflow into the chemical storage tank.

9. Extremely high mass transfer efficiency gives excellent mixing of chemicals with water.

10. Chemical Feeding is constant, rather than in "slugs" as with pumps.

11. Visual indication of feed rates and chemical flow at all times.

#### FLOW METER CAPACITIES

High precision variable area flow meters are available with dual English/Metric scale maximum capacities of 5.0, 10.0, 25.0, 50.0, and 120 gallons per hour, as well as 20.0, 40.0, 100.0, 200.0, and 420 liters per hour, respectively. All flow metering tubes and rate valves are interchangeable and may be changed in the field without special tools. "Turn down" capability on all flow meters is 20:1, allowing a wide range of chemical feed rates to be accommodated.

#### MODULAR DESIGN

SUPERIOR VacuFeed-X™ Liquid Chemical Feed System is designed to allow all of the major components, vacuum regulator, flow meter panel, check valves, and ejector to be removed and serviced or maintained, without completely dismantling the entire system.

#### MATERIALS OF CONSTRUCTION

One of VacuFeed's major competitive advantages is the use of the finest, strongest and most durable materials available. Extensive use of Fluoroplastics and fiberglass reinforced thermo-plastics allow VacuFeed to withstand attack by chemicals and to give the longest operational life. Use of very high strength plastics reduces possibility of cracking due to physical abuse or overtightening. All elastomers are specifically chosen to resist swelling and cracking in the liquid medium being used.

#### SYSTEM OPERATION

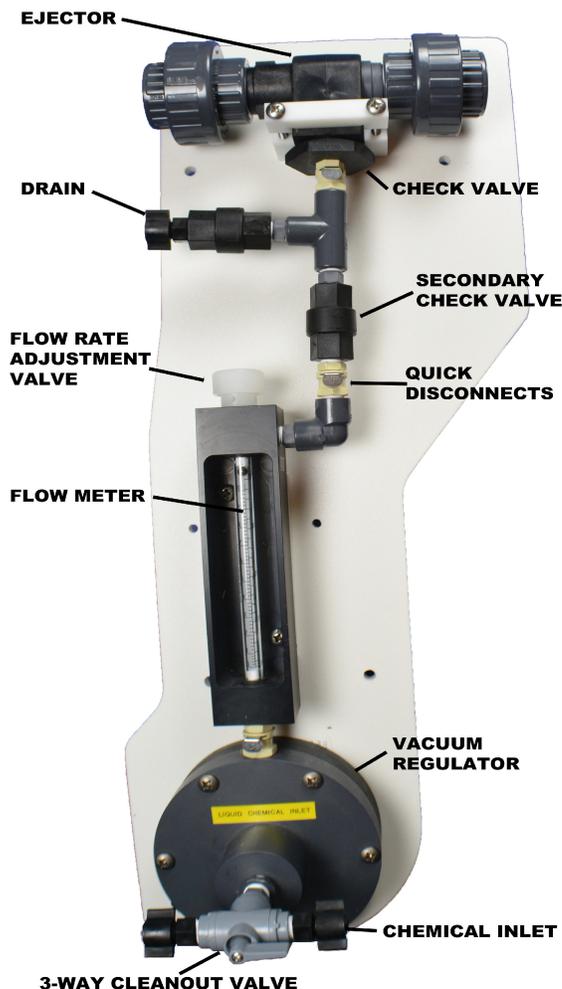
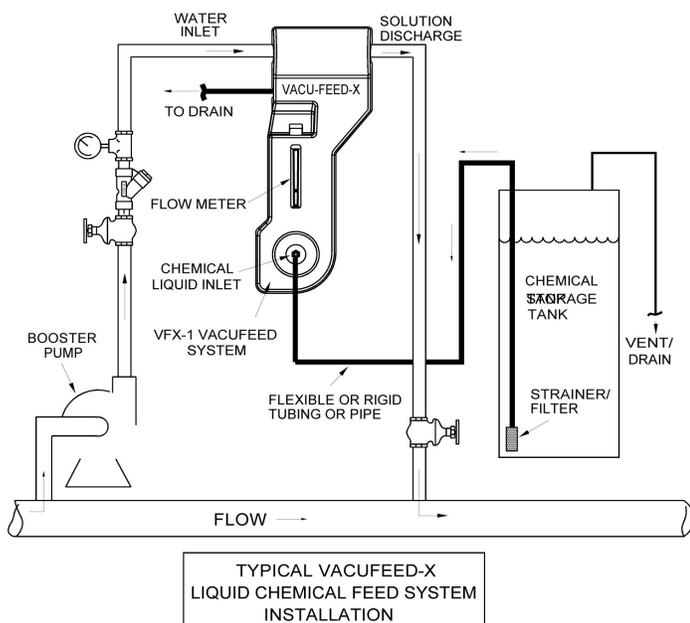
Water under pressure flows through the ejector at high velocity which causes a strong vacuum to be created. This opens the check valves in the ejector assembly as well as the secondary "triple bypass", and transmits a vacuum signal through the flow meter tube/rate valve panel and back to the vacuum regulator. When the vacuum reaches a pre-set level, the diaphragm in the regulator moves to open the inlet safety valve, permitting liquid to flow from the chemical

storage tank. The spring-opposed diaphragm and inlet valve regulate the vacuum at this point.

Liquid chemical passes through the flow meter panel and rate control valve to the ejector. The chemical mixes with the ejector water and is discharged through the diffuser into the water being treated.



MODEL	MAX. GPH	MAX. LPH
VFX-1	10.0	40.0
VFX-2	20.0	100.0
VFX-5	50.0	200.0
VFX-12	120.0	420.0



### STANDARD ACCESSORIES

- 25 ft. - 3/8" drain tubing
- 1 - Drain insect screen

### OPTIONAL ACCESSORIES AVAILABLE

- |                      |                  |
|----------------------|------------------|
| Inlet Water Assembly | Gas Masks        |
| Residual Analyzers   | Gas Detectors    |
| Booster pumps        | Scales           |
| Automatic Controls   | Gauges           |
| Chlorine Comparators | Others Available |

### OTHER SUPERIOR™ SYSTEMS AVAILABLE

- AUTOMATIC SWITCHOVER GAS CHLORINATORS
- MULTIPLE-POINT GAS CHLORINATORS
- 200 PPD (5 KG/HR)    500PPD (10 KG/HR)
- GAS SULFONATORS (DECHLORINATOR)
- AMMONIATORS
- AUTOVALVE AUTOMATIC FLOW PROPORTIONING
- AUTOVALVE AUTOMATIC RESIDUAL CONTROL
- AUTOVALVE AUTOMATIC COMPOUND LOOP CONTROL
- WATERGUARD COLORIMETRIC Cl<sub>2</sub> ANALYZERS
- WATERGUARD AMPEROMETRIC Cl<sub>2</sub> ANALYZERS



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### SPECIFICATIONS

The liquid chemical feed system shall be SUPERIOR VacuFeed-X™ MODEL \_\_\_\_\_ manufactured by Chemical Injection Technologies, Inc., Ft. Pierce, Florida, and shall have a maximum liquid flow rate of \_\_\_\_\_ gallons per hour (l/hr) of liquid chemical feed and shall be equipped with a liquid flow meter of \_\_\_\_\_ gallons per hour (l/hr). The system shall be constructed of materials designed to withstand the effects of \_\_\_\_\_.

The liquid chemical feed system shall be of modular design consisting of a vacuum regulator, flow meter/rate valve panel, ejector/check valve assembly, secondary check valve, and pressure relief/drain valve. Each of these assemblies shall be capable of being individually removed for maintenance or service without removing the entire liquid feed system.

The flow rate meter panel shall incorporate a flow rate control valve made of fluoroplastic material which is inert to the corrosive effects of chemicals being fed. Design shall provide for full closing of the rate valve without engaging the control surfaces, to prevent damage.

Vacuum shall be created by a fixed-throat venturi/ejector system connected directly to the chemical solution diffuser. A check valve system shall prevent water from entering the liquid feed system. The ejector assembly shall be capable of withstanding water pressure up to 300 PSIG (20.7 Bars).

The system shall incorporate a spring opposed diaphragm vacuum regulator which shall maintain a pre-set vacuum upstream of the flow meter/rate control valve panel. The vacuum regulator inlet valve shall close tight upon loss of operating vacuum, and allow start/stop operation without change in the liquid flow rate. Liquid chemical feed rate shall not be affected by changes in chemical storage tank levels, by variations in ejector supply water pressures, or by variations in ejector backpressure.

### LIQUID COMPATIBILITY (Specify):

- |                      |                         |
|----------------------|-------------------------|
| Sodium Hypochlorite  | Sodium Bisulfate        |
| Calcium Hypochlorite | Other (Consult Factory) |
| Aqueous Ammonia      |                         |