



# Chemical Injection Technologies

## Product/Specification Bulletin

### SUPERIOR Gas Sulfonator Series SD-1 Direct Cylinder Mounted - All Vacuum

#### GENERAL DESCRIPTION

The SUPERIOR Series SD-1 Gas Sulfonator is a state-of-the-art, vacuum-operated, solution feed type which mounts directly on a sulfur dioxide cylinder valve. The sulfonator is mounted onto the sulfur dioxide cylinder valve using a very heavy-duty, positive yoke clamp connection. A sulfur dioxide gas flow meter panel indicates the amount of sulfur dioxide being fed and may be located wherever it is safest and most convenient. Sulfur dioxide flow rate is manually adjusted and the design permits easy addition of a number of automatic flow rate control devices. A high efficiency, water operated ejector produces the vacuum necessary to operate the system. The ejector assembly contains a back-flow check valve system to prevent pressurized water from entering the sulfonator. A spring-opposed diaphragm vacuum regulator controls the sulfur dioxide gas flow rate and also acts as the safety shut-off valve.

#### FEATURES

The SUPERIOR Series SD-1 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. A new ultra-thick, fluoroplastic yoke coating gives superior corrosion resistance, won't crack, peel or chip. Sulfur dioxide will not diffuse through it to cause coating bubbling and peeling.
2. All molded parts are high impact PVC plastic, designed for superior strength, warp-resistance and sulfur dioxide resistance.
3. The rate valve "Seat" is pure fluoroplastic and will not swell, stick or become brittle with age or exposure to liquid sulfur dioxide.
4. All external bolts and nuts are Titanium for complete corrosion resistance..a SUPERIOR exclusive. There are no stainless steel or monel nuts and bolts to corrode and freeze up in the presence of moist sulfur dioxide gas.
5. Extra heavy-duty outlet threads on the ejector diffuser prevents accidental breakage from over-tightening or "bumping" of the ejector assembly.
6. The "Universal" ejector diffuser allows use of high pressure solution hose, direct ejector mounting in mains, or in-line piping with rigid solution pipe.
7. Easier to service and perform routine maintenance, with standard size wrench lugs provided on all screwed-together ejector parts. No more pipe wrenches to accidentally tear and scrape plastic surfaces.
8. All vacuum fitting holes are heavily reinforced to prevent the possibility of cracking from over-tightening fittings.
9. "Dual-pressure" check valve is standard on all SUPERIOR gas Sulfonators. Proven high back-pressure unitized check valve design protects against sudden surges up to 300 PSIG while a spring-loaded diaphragm check provides positive shutoff even when there is no back-pressure to force the seat closed.

10. PVDF vacuum tubing fittings are standard..another SUPERIOR exclusive. "User friendly" design makes it easy to attach tubing, and to tighten or loosen ferrule nuts without tools.

11. Fewer parts, combined with superior materials and a superior design gives you a SUPERIOR Gas Sulfonator.

#### FLOW METER CAPACITIES

SUPERIOR'S modular design concept allows the sulfur dioxide gas indicating meter and flow rate control valve to be located wherever it is most convenient for the operator, and also in the safest location. Variable area flow metering tubes are available with dual English/Metric scale maximum capacities of 0.8, 1.5, 4, 10, 25, 50 and 100 pounds per 24 hours of sulfur dioxide gas, as well as 15, 30, 75, 200, 500, 1000 and 2000 grams per hour, respectively. All metering tubes are interchangeable and may be changed in the field without special tools.

#### MODULAR DESIGN

Superior Gas Sulfonators have been designed to give the maximum flexibility in system installation. Each component of the sulfonator, vacuum regulator, metering tube panel, and ejector can be placed wherever it is safest and most convenient for operating personnel. The regulator may be mounted on the sulfur dioxide cylinder in a safe storage area while the remote meter tube panel is placed in an easily accessible place since it operates completely under vacuum. The ejector can be located wherever plumbing and/or hydraulic conditions make it most desirable. Modular design also makes it easy and inexpensive to expand or upgrade the system.

#### MATERIALS OF CONSTRUCTION

One of SUPERIOR'S major competitive advantages is the use of the finest, strongest and most durable materials available. Extensive use of Fluoroplastics and high-impact thermoplastics allow SUPERIOR Gas Sulfonators to withstand attack by sulfur dioxide in any form and to give the longest operational life. Many parts are

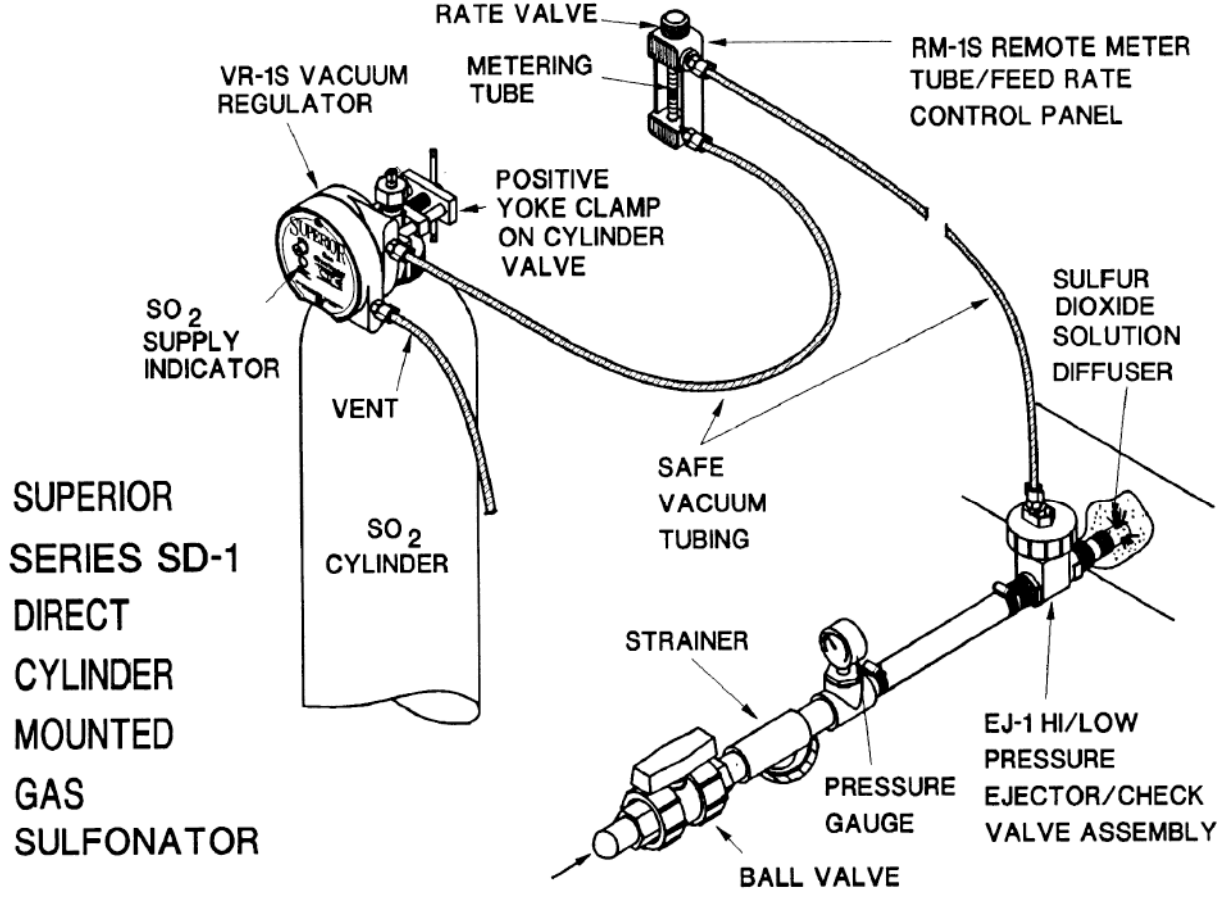
guaranteed for the life of the equipment against sulfur dioxide damage.

#### SYSTEM OPERATION

The vacuum regulator is securely clamped onto the sulfur dioxide cylinder valve. 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 and transmits a vacuum signal through the remote 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 sulfur dioxide inlet safety valve, permitting gas to flow from the sulfur dioxide cylinder. The spring-opposed diaphragm and inlet valve regulate the vacuum at this point.

Sulfur dioxide gas passes through the remote flow meter panel and rate control valve to the ejector. The gas mixes with the ejector water and is discharged through the diffuser into the treated water.





**SUPERIOR  
SERIES SD-1  
DIRECT  
CYLINDER  
MOUNTED  
GAS  
SULFONATOR**

**TYPICAL INSTALLATION**

**SPECIFICATIONS**

The sulfonator shall be SUPERIOR MODEL SD-1 manufactured by Chemical Injection Technologies, Inc., Ft. Pierce, Florida, and shall have a maximum capacity of \_\_\_\_\_ pounds per day (gr/hr) of sulfur dioxide feed and shall be equipped with a sulfur dioxide flow meter of \_\_\_\_\_ pounds per day (gr/hr).

The sulfonator shall be of modular design consisting of a vacuum regulator, flow meter/rate valve panel, and ejector/check valve. Each of these assemblies shall be capable of being individually located wherever safety and/or operator convenience dictates.

The vacuum regulator shall mount directly on the cylinder valve by means of a positive yoke type clamp having an integral tightening screw with slide bar handle. No wrenches or other tools shall be required to mount or dismount the vacuum regulator from the cylinder. The cylinder valve/sulfonator inlet adaptor shall be constructed of corrosion-proof fluoroplastic material which shall be inert to the effects of wet, dry or liquid sulfur dioxide. The inlet safety shut-off/vacuum regulating valve shall be of capsulated design, easily removable as a unit from the outlet side of the yoke. A fluoroplastic filter shall be installed in the vacuum regulator inlet and shall be capable of removing impurities greater than 25 microns. A pressure relief valve shall be incorporated into the vacuum regulator to prevent pressure from building up in the system. All external screws and nuts shall be made of Titanium to prevent corrosion.

The flow meter/rate control valve panel assembly shall be separate from the vacuum regulator and ejector assemblies and shall be capable of mounting wherever it is safest and most convenient for operating personnel. The panel shall be constructed of high impact PVC plastic material and shall incorporate a flow rate control valve made of fluoroplastic material which is inert to the corrosive effects of sulfur dioxide. The rate valve metering tip shall be constructed of pure silver. 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 sulfur dioxide solution diffuser. A dual high-pressure/low-pressure check valve system shall prevent water from entering the gas system. The ejector assembly shall be capable of withstanding water pressure up to 300 PSIG (20.7 Bars). A universal-type sulfur dioxide solution diffuser shall be provided which shall allow close-coupling of the ejector to a water main, use of flexible solution hose or rigid solution pipe without the use of special adaptors.

**STANDARD ACCESSORIES**

- 25 ft. - 3/8" Vent & vacuum tubing
- 10 - Lead cylinder connection gaskets
- 1 - Cylinder Wrench
- 1 - Vent insect screen

**OPTIONAL ACCESSORIES AVAILABLE**

- |                        |                            |
|------------------------|----------------------------|
| Inlet Water Assembly   | Gas Masks                  |
| Wall manifold kits     | Gas Detectors              |
| Booster pumps          | Scales                     |
| Residual Analyzers     | Gauges                     |
| Automatic Controls     | Sulfur dioxide Comparators |
| Ton Container Adaptors | Others Available           |

**OTHER SUPERIOR SYSTEMS AVAILABLE**

- AUTOMATIC SWITCHOVER GAS SulfonatorS
- MULTIPLE-POINT GAS SulfonatorS
- 200 POUNDS PER DAY (5 KG/HR)
- 500 POUNDS PER DAY (10 KG/HR)
- GAS SULFONATORS (DESulfonator)
- AMMONIATORS
- AUTOMATIC FLOW PROPORTIONING
- AUTOMATIC RESIDUAL CONTROL



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