



Chemical Injection Technologies

Technical Bulletin

SUPERIOR™ Gas Sulfonators

Materials and Installation Notes

DESIGN

SUPERIOR™ Gas Sulfonators are identical in design and function to SUPERIOR™ Gas Chlorinators. All features, advantages, dimensions and specifications contained in SUPERIOR™ Gas Chlorinator literature may be interchanged for use with SUPERIOR™ Gas Sulfonators.

MATERIALS

Sulfur Dioxide (SO₂) in a dry (anhydrous), gaseous state is relatively compatible with a number of common engineering plastics, as well as most ferrous metals. However, when SO₂ comes in contact with moisture (liquid or vapor) it forms acids that can cause serious corrosion to most metals and even some plastics. The same situation applies to Chlorine as well. In addition, Chlorine and Sulfur Dioxide gases have almost identical specific gravities. Both PVC and ABS plastics have been used for decades with both of these gases, in a vacuum state (below atmospheric pressure) with very good results. Thus, it would seem that a common gas feeding device should be applicable for both of these gases.

However, PVC (Poly Vinyl Chloride) and ABS (Acrylonitrile Butadiene Styrene) react quite differently to these two gases when they are in their pure liquid state. ABS has proven to be able to withstand a brief exposure to liquid chlorine, in an unpressurized condition, with little or no noticeable attack. PVC, on the other hand, will be severely attacked by liquid chlorine. These two situations are reversed with liquid Sulfur Dioxide. PVC will withstand attack but ABS will be severely damaged by liquid SO₂.

Thus, SUPERIOR™ Gas Chlorinators are designed so that the areas which could come in contact with liquid chlorine are constructed of either ABS or materials that are impervious to any form of chlorine or SO₂. SUPERIOR™ Gas Sulfonators are designed so that the areas which could come in contact with liquid SO₂ are constructed of either PVC or materials that are impervious to any form of chlorine or SO₂. These other materials consist of, but are not limited to, PVDF, Teflon® and Tantalum.

RELIQUIFICATION OF SULFUR DIOXIDE

A major physical property difference between chlorine gas and sulfur dioxide gas is the tendency of SO₂ to reliquify with a very small change in temperature. It has also been found that SO₂ has a greater likelihood of forming small droplets of liquid at the cylinder valve outlet, which are carried into the sulfonator regulator area without vaporizing, when ambient temperatures fall below 50° F, although high SO₂ feed rates can cause some reliquification at ambient temperatures up to 72° F.

It is recommended that Sulfonator installations be made in temperature controlled environments whenever possible and practical. When ambient temperatures are likely to fall below 50° F, a heated enclosure is necessary to avoid operational problems caused by liquid SO₂ entering the gas regulator. While reliquified SO₂ will not cause irreparable damage to SUPERIOR Gas Sulfonators, the re-vaporization of SO₂ inside the vacuum regulator and metering areas will create deposits of impurities which will cause operating problems.