

# Actuating Chlorine And Sulfur Dioxide Safety

Drinking water and wastewater treatment operators are in a hazardous line of work. Beyond the large, complicated machinery they rely on, the use of chlorine and sulfur dioxide is a regular part of operations, two chemicals that can prove dangerous if not handled properly.

To gain a better understanding of how these chemicals are stored, and hopefully improve worker safety, Water Online spoke with [JCS Industries](#). We covered the history of chlorine and sulfur dioxide in treatment, the importance of proper storage, and a product that can help keep operators safe.

## How are chlorine and sulfur dioxide used in water treatment?

Chlorine was first introduced into the U.S. public water supplies in the early 1900s as a primary disinfectant. It was later used in wastewater discharges in order to reduce bacteria from the effluent prior to entering receiving streams.

In wastewater, it was determined that disinfection by-products (DBPs) were forming, which were considered to be a detriment to the receiving stream that affected aquatic life. The solution to this issue was to strip residual chlorine by feeding in sulfur dioxide. Sulfur dioxide, or sulfite salts, reacts with residual chlorine to reduce and eliminate it from the effluent stream.

## How are these chemicals typically stored at treatment operations?

Chlorine and sulfur dioxide are chemicals



that are compressed, liquefied, and stored in three sizes of steel vessels. These vessels are 150-pound cylinders, 2,000-pound containers, and, to a lesser extent, 90-ton railcars.

Though both chemicals are corrosive and are an inhalation hazard, in the absence of oxygen they are considered stable. Once these chemicals are exposed to the atmosphere, they become corrosive and hazardous.

Special materials and valves are required to handle these chemicals once they are outside of their container.

## What potential dangers do these chemicals pose if not stored and maintained properly?

Inside the containers, both chlorine and sulfur dioxide are stable chemicals because of the absence of oxygen. Once atmosphere is introduced, these chemicals change from chlorine to hypochlorous acid and from sulfur dioxide to sulfuric acid, thus producing inhalation hazards.

Since these chemicals are stored in compressed cylinders, the temperature in the storage area is critical. All containers are fitted with special relief valves that are designed to relieve excessive

pressure buildup at or about 165 degrees Fahrenheit.

Another potential danger to take into consideration is the placement of vent lines from the feed equipment. All chlorine and sulfur dioxide feed equipment has a pressure relief device incorporated into its design called the vent. The vent is designed to relieve any excess pressure in the feed system. Placement of these vent lines is also very critical. Since both chemicals in the gas form are heavier than the air, vent lines must be placed low on the ground and in an area where the escaping gas cannot concentrate.

#### Why is it critical to open and close the valves on these containers remotely?

There are devices on the market today that can be placed on the compressed gas cylinders that will automatically close the main gas supply valve in the event of a leak which is sensed by a gas leak detector. These devices are known as actuators.

Actuators can open and close the container valve locally. Our Model U actuators have the ability to remotely open and close the container valve. When using these actuators, operators can control the gas supply safely from remote locations. This scenario adds to the overall safety of systems, especially when multiple cylinders are in use.

#### How does an operator control the Model U actuator?

First, the Model U actuator is installed on



the valve and aligned. Once the actuator is aligned, the operator can remotely open and close the valve at their discretion. During normal operation, a signal from a gas leak detector can close all or specific containers when a leak is sensed. Outputs that are built into the actuator can be wired to the operator's control or alarm system to alert when an event occurs.

#### How can the Model U be mounted to the container?

The Model U actuator is a device that is fitted directly to the container's valve because most major leaks occur where the feed system connects to the container. The Model U actuator fits on both 150-pound cylinders and 1-ton containers without

the need for any special tools. The Model U has the capability of gas and/or liquid withdrawal when used on ton containers.

#### How does this actuator eliminate the need for scrubbers?

The Model U actuator is designed so that once a leak is detected, it will shut down all containers that have an actuator installed. This automatic closure of all containers eliminates or lessens the need to have the scrubber because, depending on your leak monitor's parameters, only a miniscule amount of gas will be allowed to escape the leaking container.

Scrubbers are designed to evacuate the air within a closed room. Most designs only take into consideration the amount of chemical that is online and not the standby containers. Any container that is in the system that is online or online but in the standby mode can be fitted with an actuator. This means that all containers are protected.

#### How else can the Model U be seen as a cost-effective tool for treatment operations?

The Model U actuators can be installed and used in existing systems without the need for special structures or construction. Scrubbers, on the other hand, require extensive engineering time and cost to operate. Both dry and wet scrubbers require eventual media or chemical changeout. Typically, the annual maintenance of a Model U actuator is comprised of a battery replacement. ■