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CHLORINE SAFETY STEWARDSHIP BULLETIN - 1 (Revised: 4/14/04)

Additional Safety Devices and Information for Packaged Chlorine Users

Scope: The Chlorine Institute's Packaging Committee formed a Task Group to gather information and develop a document on additional equipment or systems for consideration by both Packagers and end-users of chlorine that could enhance and improve the safety of their operations.

1. Valve Closure Systems

Systems can be equipped with valves and/or actuators that will close, stopping the flow of chlorine. These units should only be used to close valves in an emergency, not as a routine part of your operation.

There are two approaches to consider: one involves placing an actuator on the chlorine container valve and the second approach is to place a separate valve with its own actuator on the unloading line near the container valve. They can be designed to close automatically when activated by chlorine monitors, in-line pressure sensors, and/or be closed manually from a remote location. A manual override for the valve should be incorporated into the design in case of failure of the chlorine detectors and/or sensors.

CI Pamphlet 6, *Piping Systems for Dry Chlorine*, gives recommendations on valve construction.

The Chlorine Institute contacted known vendors of these actuators. Information received was compiled into a standard format.

The Chlorine Institute has not independently verified the information provided by the manufacturers. Users should contact the manufacturers directly to get current information.

Any manufacturer who believes its information is not accurate or who may have inadvertently not been contacted should provide specific information to the Secretary of the Institute.

Suppliers of shut-off devices for chlorine cylinders and ton containers:

1. Capital Controls, Colmar, PA // Ph: 215-997-4000 // Fax: 215-997-4062
2. Halogen Valve Systems, Inc., 17961 Sky Park Circle, Suite A, Irvine, CA // Ph: 949-261-5030 // Fax: 949-261-5033
3. Hydro Instruments, 1501 West Park Avenue, Perkasi, PA 18944 // Ph: 215-453-3102 // Fax: 215-453-3106

4. ITT Engineered Valves, Lancaster, PA // Ph: 717-509-2200 // Fax: 717-509-2336
5. Jamesbury Inc., Worcester, MA // Ph: 508-852-0200 // Fax: 508-854-4783
6. Powell Fabrication and Manufacturing, St. Louis, MI // Ph: 517-681-2158 // Fax: 517-681-5013

2. Line Pressure Warning System

One of the most common causes of chlorine exposure is when a cylinder or ton container is disconnected and the line is still under pressure and/or the container valve was never closed properly. To assure that a chlorine line is depressurized prior to disconnection, consideration should be given to the installation of a pressure sensing device in the line. As an example, the pressure sensing device can be connected to red and green operating lights, such that whenever the pressure is below a specified value the green light will be lit (indicating it is safe to disconnect the line), and whenever the pressure is above the specified value the red light will be lit (indicating it is not safe to disconnect the line). A vacuum system like those used for vacuum chlorinators is needed to depressurize the line. The set-point for switching from the red to green light should be at a slight vacuum (for example, several inches of water). If a vacuum system cannot be used, the set point will have to be at a slight pressure (for example, less than 1 psig). Such a system should be used in addition to a pressure/vacuum gauge; it is not a replacement for a gauge. All equipment should be maintained according to the manufacturers' recommendations. These indicator lights can be located in such a way that supervisors can monitor the operation from a distance.

A list of the equipment needed is included below. All equipment in contact with chlorine must be compatible, dry, clean, and able to handle the pressures within the system. Using this information, Packagers can adapt this system for use at Packaging plants.

List of Equipment

1. Standard red and green lights designed for 120 VAC service.
2. Dual-duty pressure switch (high/low) or single-duty pressure switch with adjustable dead band. Both must be available in materials that are compatible with liquid chlorine and not contain fluids or materials that can react dangerously with chlorine should a seal or a diaphragm fail.
3. Chlorine compatible pressure/vacuum gauge (still essential for a system).
4. A vacuum feed system or waste system to use or absorb the residual chlorine gas in the system (i.e., vacuum injector system).

(See Figure PS 1-A Cylinder/Ton Container Use Site)

3. Other Equipment & Devices

The following devices should also be considered.

A. **Direct Mounted Vacuum Chlorinators**

Users of chlorine cylinders and ton containers feeding gaseous chlorine have an additional option - the container mounted vacuum chlorinator. These devices attach directly to the cylinder or the vapor (upper) valve on a ton container. They require a vacuum in the system to operate. If the vacuum is lost due to either a break in the system or the loss of water flow through the venturi, then the vacuum chlorinator will stop the flow of gas. The following companies claim to manufacture direct mounted vacuum chlorinators. The Chlorine Institute has not independently verified information provided by these companies. Users should contact the manufacturers directly to get current information.

Any manufacturer who believes this information is not accurate should provide specific information to the Secretary of the Institute.

1. Capital Controls, Colmar, PA // Ph: 215-997-4000 // Fax: 215-997-4062
2. Hydro Instruments, 1501 West Park Avenue, Perkasie, PA 18944 // Ph: 215-453-3102 // Fax: 215-453-3106
3. Wallace and Tiernan Division of U.S. Filters, Vineland, NJ // Ph: 856-507-9000 // Fax: 856-507-4030
4. Chlorinators, Inc., Jensen Beach, FL // Ph: 305-334-8070

B. **Atmospheric Monitoring Equipment for Chlorine**

CI publishes Pamphlet 73 on this subject. This equipment can be used to detect leaks and to monitor chlorine levels. Fixed area detectors are not intended to monitor personnel exposure nor to quantify leaks in the absence of other input. As of the publication date, there are no federal regulations within the United States which mandate the installation of ambient chlorine monitors. However, state and local rules may require the use of monitors for specific situations.

For information on these products obtain C.I. Pamphlet #73. Visit the C.I. website to order (www.CL2.com).

C. **Paint That Changes Color When Exposed to Acid Gases Like Chlorine**

A paint can be obtained that changes color from yellow to red when it is exposed to acid gases like chlorine. When painted with this product, piping systems will change colors at the leak site even if a relatively minor leak occurs. The paint will eventually return to its yellow color after the leak is stopped.

The Chlorine Institute is aware of only one supplier of this paint - AWC, Inc., St. Louis, MO // Ph: 636-530-0788 // Fax: 636-536-4102. Please contact them for any information on technical data you need. If anyone has additional information about this or other, like products, please provide detailed information to the Secretary of The Chlorine Institute.