

The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

# DISINFECTION STORAGE & HANDLING

# CHECK LABELS ON CHEMICAL CONTAINERS



EVERY CHEMICAL CONTAINER MUST HAVE A WARNING LABEL

## Health Hazard



- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

## Flame



- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

## Exclamation Mark



- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

## Gas Cylinder



- Gases Under Pressure

## Corrosion



- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

## Exploding Bomb



- Explosives
- Self-Reactives
- Organic Peroxides

## Flame Over Circle



- Oxidizers

## Environment (Non-Mandatory)



- Aquatic Toxicity

## Skull and Crossbones



- Acute Toxicity (fatal or toxic)

# Chemical storage & handling

- ▶ Many chemicals have associated hazards  
=> specific storage
  - ▶ Acids
  - ▶ Flammables
  - ▶ Highly toxic materials
  - ▶ Peroxide formers
- ▶ Incompatible chemicals should be kept separate
  - ▶ Oxidizing & reducing agents
  - ▶ Acids & bases



# CHLORINE

- **Chlorine** is a toxic gas that irritates the respiratory system. Because it is heavier than air, it tends to accumulate at the bottom of poorly ventilated spaces. Chlorine gas is a strong oxidizer, which may react with flammable materials.
- **Chlorine** is detectable with measuring devices in concentrations of as low as 0.2 parts per million (ppm), and by smell at 3 ppm. Coughing and vomiting may occur at 30 ppm and lung damage at 60 ppm. About 1000 ppm can be fatal after a few deep breaths of the gas.↓

# CHLORINE SAFETY

Chlorine need not be a serious hazard if the people working with it are properly trained in its handling.

The following are some guidelines for assuring the safe handling of chlorine.

1. Provide proper instruction and supervision to workers responsible for chlorine equipment.



# CHLORINE SAFETY

- 2. Provide proper and approved self-contained breathing apparatus in areas where chlorine is stored or used.**
- 3. Keep all breathing apparatus stored outside the chlorine area.**



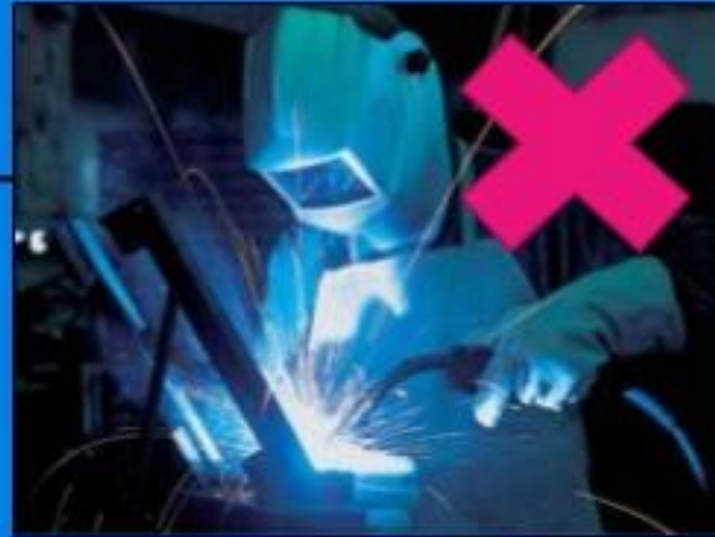
# CHLORINE SAFETY

4. Prepare escape plans from areas where there might be a chlorine emission. Remember to move uphill and upwind.
5. Never store combustible or flammable materials near chlorine containers.
6. Never apply heat directly to a chlorine



# CHLORINE SAFETY

**7. Never attempt to weld an “empty” chlorine pipe line without purging it with air first.**



# CHLORINE SAFETY

8. Install safety showers and eye wash stations near chlorine equipment.
9. If there is a leak, at least two persons should make the repairs.



**SAFETY SHOWER**

# CHLORINE SAFETY

**10.** Never spray water on leaking containers; it can make the leak worse.

**11.** When entering an equipment area, take shallow breaths until you are sure that there is not a chlorine gas leak.



## **CHLORINE STORAGE**

The room where chlorine cylinders or HTH drums are stored must be kept dry and well ventilated. Chlorine should always be stored in a room separate from other chemicals. Chlorine cylinders that are empty should be separated from those that are full. When not in use, all cylinders should be chained to the wall.



· EMPTY CL<sub>2</sub> ·

**DANGER**

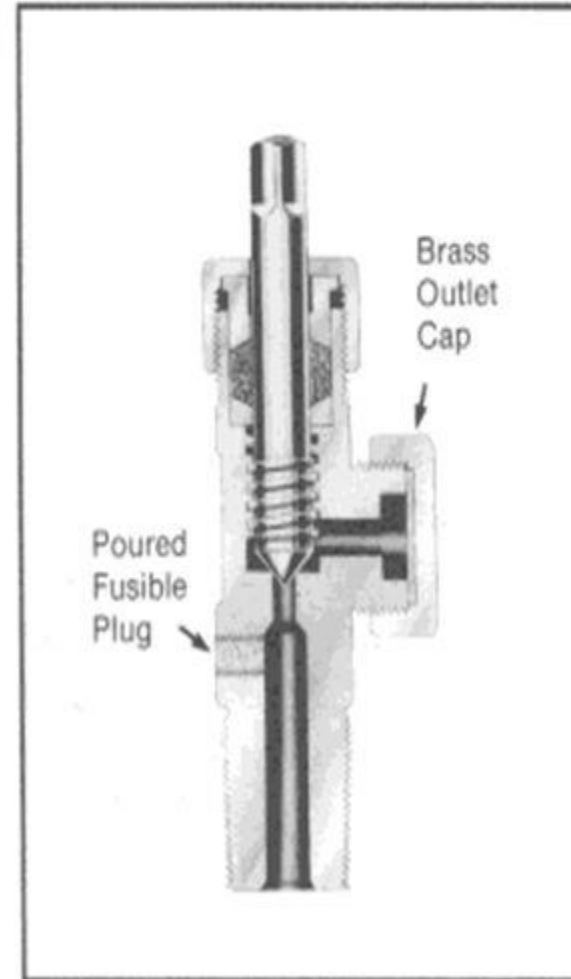
CHLORINE

· FULL CL<sub>2</sub> ·



# Chlorine Cylinder Valve

- Always **inspect** the cylinder valve before opening.
- Check cylinder fittings for leaks with **ammonia gas**
- Once the connection has been made, the valve should only be **opened 1/4 of a turn & check for leaks.**
- **Close cylinder valve first** to allow gas drain from pigtail



## **CHLORINE CYLINDERS**

NEVER remove the valve hood from a chlorine cylinder unless it is chained to the scales and ready to be put on the system. All cylinders should be chained to the wall or the scales unless they are being moved. Emergency repair kits are available that can be used to seal leaks in the broken valves or leaking cylinders. Every system that operates a gas chlorine system should have an emergency kit or be able to get access to one on very short notice.

# CHLORINE INSTITUTE EMERGENCY KIT "A" FOR 100 LB. & 150 LB. CHLORINE CYLINDERS

Edition 12, Revision 2  
July 2014



Kits manufactured after Jan. 1, 2013



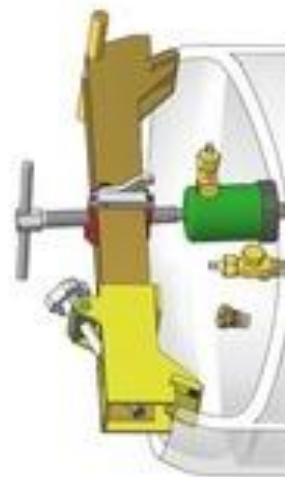
Kits manufactured before Dec. 31, 2012



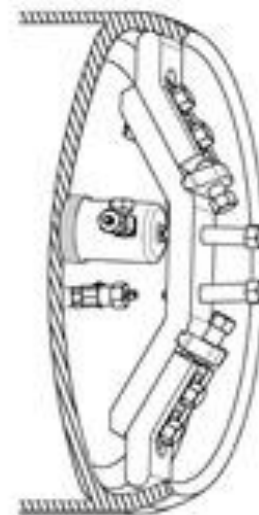
THE CHLORINE INSTITUTE INSTRUCTION BOOKLET

# CHLORINE INSTITUTE EMERGENCY KIT "B" FOR CHLORINE TON CONTAINERS

Edition 11, Revision 1  
July 2014



Kits manufactured after March 2014



Kits manufactured before April 2014

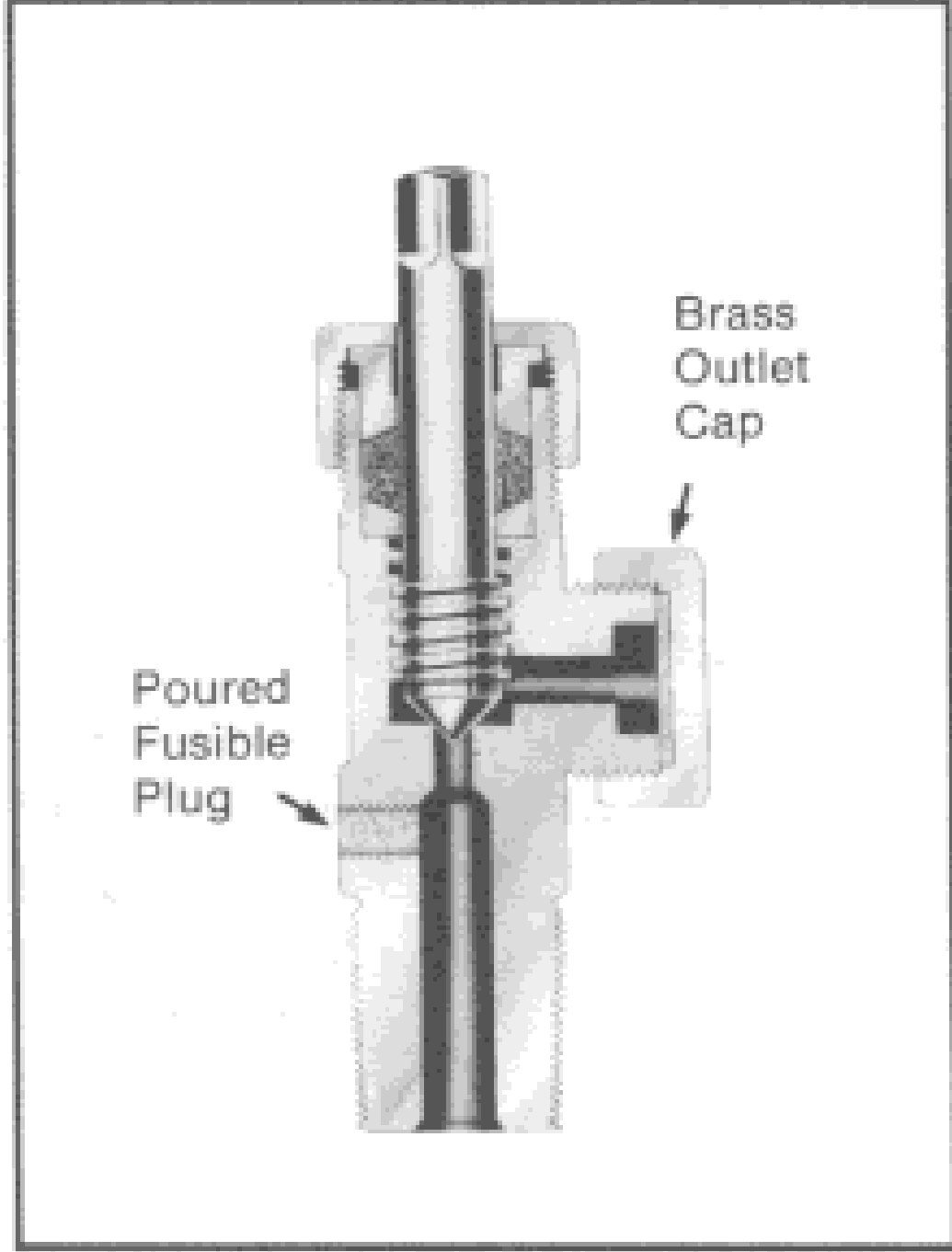
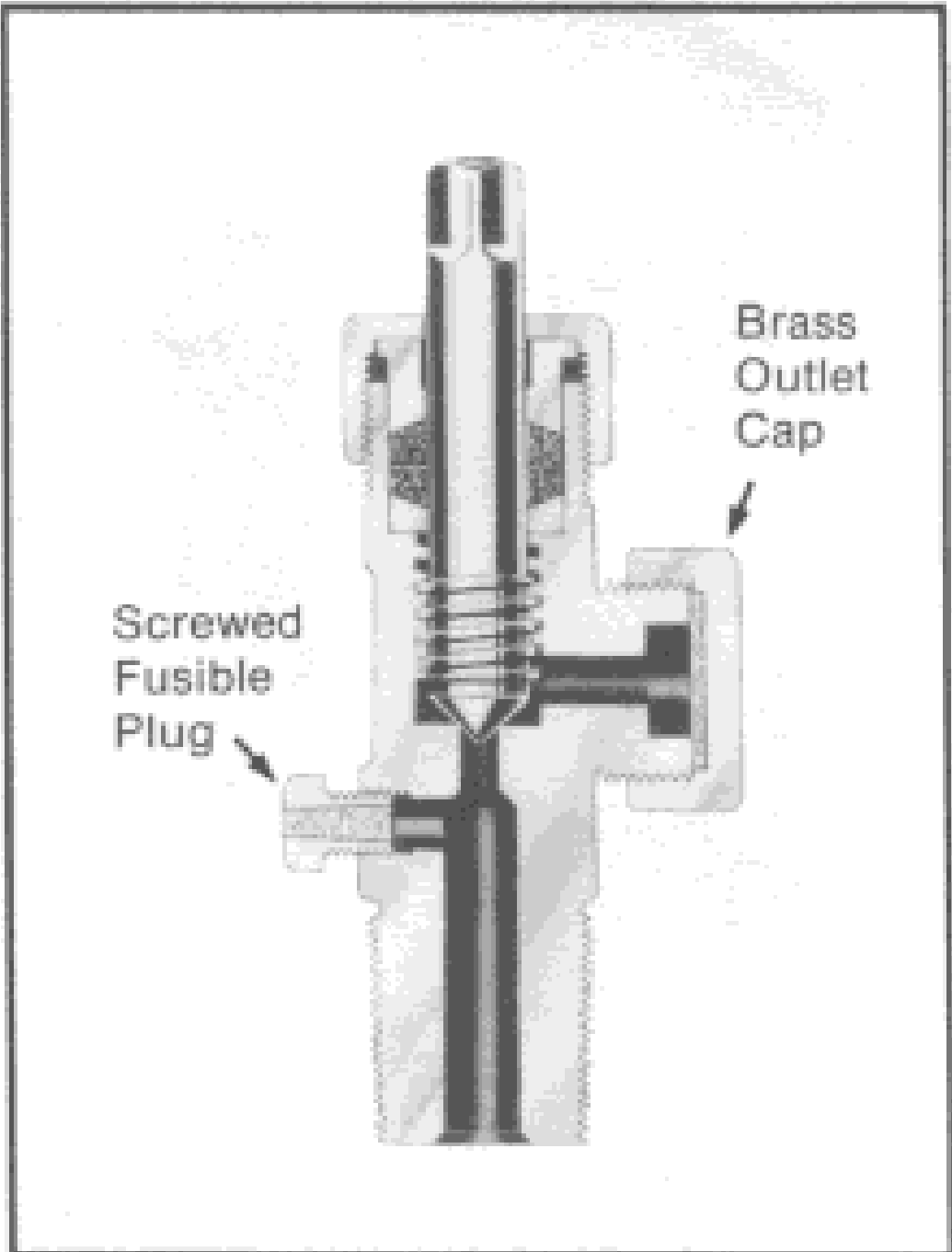


THE CHLORINE INSTITUTE

INSTRUCTION BOOKLET

# CHLORINE CYLINDERS

To prevent the cylinder from rupturing when it gets too hot, every gas cylinder will have a “fusible plug” that is designed to melt at 157° F. There is one in the valve assembly of every 150 lb. Cylinder and six (three on each end) in the body of very 1-ton cylinder. As one of these fusible plugs melts, it will allow the release of chlorine gas from the cylinder. This still represents a serious problem, but the release will be more gradual than it would if the tank ruptured.





1 Ton Chlorine gas cylinder has 6 fusible plugs, 3 on each side.

## GENERAL CHLORINE SAFETY

Chlorine is a greenish-yellow gas. It is 2.5 times heavier than air. Chlorine gas is very corrosive. It turns into hydrochloric acid when it comes in contact with moisture (in the water, in the chlorine lines, or in your eyes or lungs). It does not support combustion . It can be harmful if inhaled in small quantities and fatal in larger doses

SYMPTOM	CONCENTRATION
Noticeable odor	0.2 ppm
Irritation after several hours	1.0 ppm
Irritation of throat after a few minutes	15 ppm
Immediate coughing	30 ppm
Dangerous after 30 minute exposure	50 ppm
Lethal in minutes	1000 ppm

The following steps should be followed when a leak poses immediate danger to employees or the public:

1. Evacuate, in an upwind direction, to high ground.
2. Once evacuation is complete, notify emergency medical units of casualties and begin administering First Aid to the injured.
3. Notify local fire and police departments. Include the following information:
  - a. Nature of the accident
  - b. Approximate amount of chlorine that may be released



PLAY ► SLP  
0:00:02





# Why only 85% full?

When a chlorine cylinder is full and at room temperature, it is about 85% full of liquefied chlorine. As the temperature rises, the liquid expands and takes up more space in the cylinder. At 157° F the liquid will expand to occupy 100% of the cylinder. If the liquid expands any further the cylinder will rupture, causing a massive chlorine leak.

The background is a light blue gradient. There are several realistic water droplets of various sizes in the corners. In the top-left corner, there are three droplets of different sizes. In the top-right corner, there are two droplets. In the bottom-right corner, there is a cluster of several droplets, including a large one and several smaller ones. In the bottom-center area, there are three more droplets of varying sizes.

**Questions?**