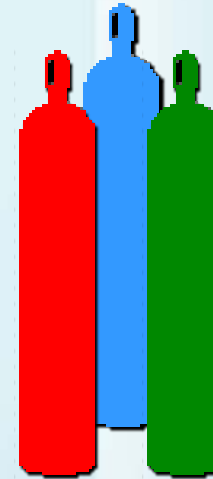


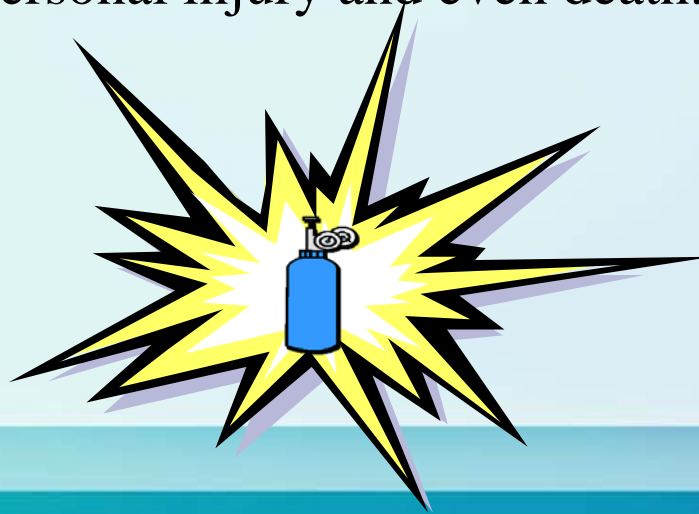
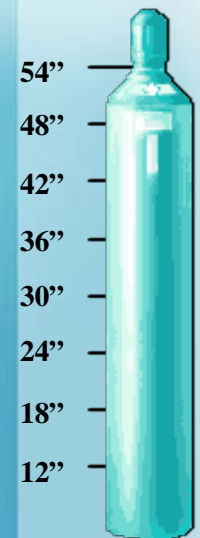
# Compressed Gas Cylinders



# Why These Guidelines Are Vital To Your Safety

**A compressed gas cylinder is like a sleeping giant. It is heavy, smooth, and hard to grip securely. It can be up to 57 inches tall, may weight up to 155 lbs full and be pressurized up to 2,200 psi.**

The effects of unintentional release of energy by a compressed gas cylinder can have devastating results. Over 150 pounds of steel, traveling at high speed, can cause severe damage, personal injury and even death.



# Hazards of Compressed Gas Cylinders

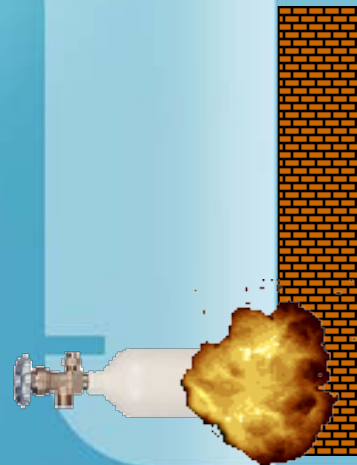
Compressed gas cylinders present both mechanical and chemical hazards in the work place.

## Physical Hazards

- Tip over
- Explosion
- Uncontrolled projectile

## Chemical Hazards

- Asphyxiation
- Poisoning
- Anesthetic effects
- Tissue Damage



# Why These Guidelines Are Vital To Your Safety

## Injuries you can avoid

The injuries that can occur are as varied as the situations causing them. Some of these injuries include:

Severe cuts, bruises, and burns

Broken bones and loss of limbs

Spinal cord injuries

Asphyxiation

Poisoning

Death





# Safe Practices for Handling & Use



# Safe Practices for Handling & Use

Some gases have very specific procedures for safe use. Before handling any compressed gas cylinder, locate the [Material Safety Data Sheet](#), or [MSDS](#), for the gas you are using. This document contains vital information for handling each gas.



# Safe Practices for Handling & Use

## Identify the Compressed Gas

Do not rely on cylinder **color**

The cylinder should be clearly stenciled or stamped

The identification label should be permanently attached to the cylinder




**If in doubt do not use the cylinder!**

**Contact Risk Management Department at 799-6496**



# Safe Practices for Handling & Use



If a valve is improperly removed, the compressed gas inside the cylinder can be released unexpectedly. If the cylinder falls and the valve is damaged the cylinder can become an uncontrolled projectile. To avoid this hazard, secure the cylinder at all times with an appropriate two-point restraint device/system.





# Safe Practices for Handling & Use

Chains are the best recommendation. Straps and table clamps often fail due to improper use and set-up. Clamps are generally not kept tight and placed on articles that are not secure (movable desks tables, etc.). Straps are often buckled incorrectly thus providing no restraint. Fasten restraints on the upper half of the cylinder, above the center of gravity (e.g., just below the top), and at the bottom ~8-12 inches from the ground.



# Safe Practices for Handling & Use

## Cylinder Valves



# Safe Practices for Handling & Use

## Pressure Regulators



Two-Stage



Low Pressure



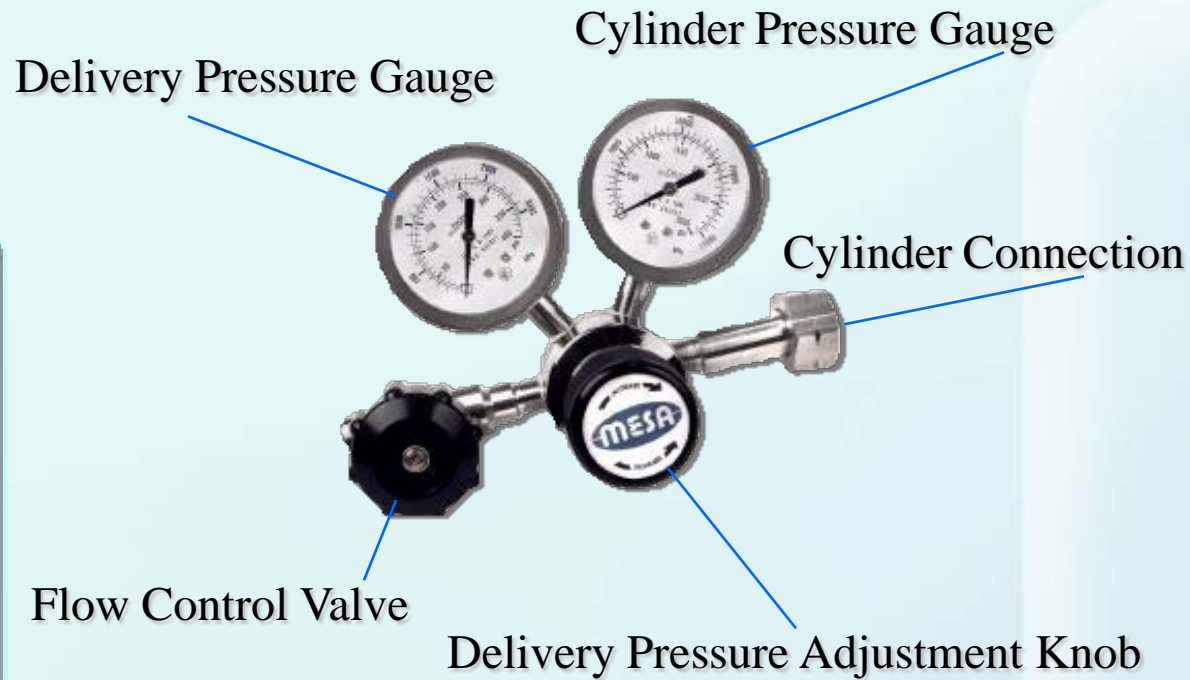
Single-Stage



High Pressure

# Components of a Pressure Regulator

## Two-Stage Gas Pressure Regulator

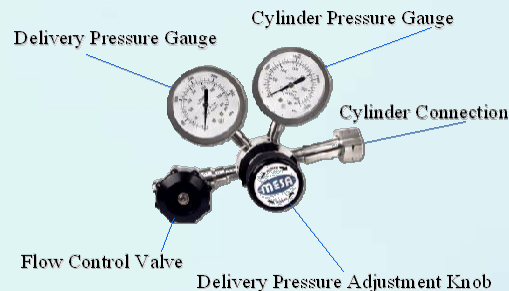




# Safe Practices for Handling & Use

## Regulator Operation

- 1 Attach the regulator to the cylinder valve outlet.
- 2 Turn the delivery pressure adjustment knob counterclockwise until it turns freely.
- 3 Ensure the flow control valve is in the closed position.
- 4 Slowly open the cylinder valve until the regulator registers the cylinder pressure.
- 5 Turn the delivery pressure adjustment knob clockwise until the desired delivery pressure is reached.



**Be certain that the tubing used to convey the gas from the regulator to its end use is compatible with the gas.**

**Example: Copper tubing + acetylene = copper acetylide (explosive)**



# Safe Practices for Handling & Use

## Gas Cylinder Operation



# Safe Practices for Handling & Use

## Opening cylinders:

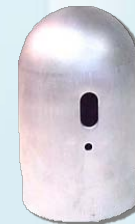
- 1 Place the cylinder in an upright position so the valve is always within reach.
- 2 Check fume hood or ventilation.
- 3 Warn co-workers that you are about to open the valve and position the cylinder with the valve pointing away from you.
- 4 Be sure fittings are clean, dry, and free of oil or grease.
- 5 Be sure the threads on the regulator correspond with those on the cylinder valve outlet.
- 6 Use regulators and pressure gauges only with gases for which they are designed.
- 7 Open the valve slowly and close the valve immediately when finished.



# Safe Practices for Handling & Use

## Closing cylinders:

- 1 Close the cylinder valve completely.
- 2 Bleed the lines if possible.
- 3 Tighten the flow control valve on the regulator or remove it if the cylinder is empty.
- 4 Replace the safety cap.



# Inspecting & Testing Compressed Gas Cylinders

Regularly inspect cylinders.  
Take a few extra minutes to inspect the compressed gas cylinder. It could save you and your co-workers from serious injury.

## Ask these questions:

**Does the cylinder show signs of defects?**

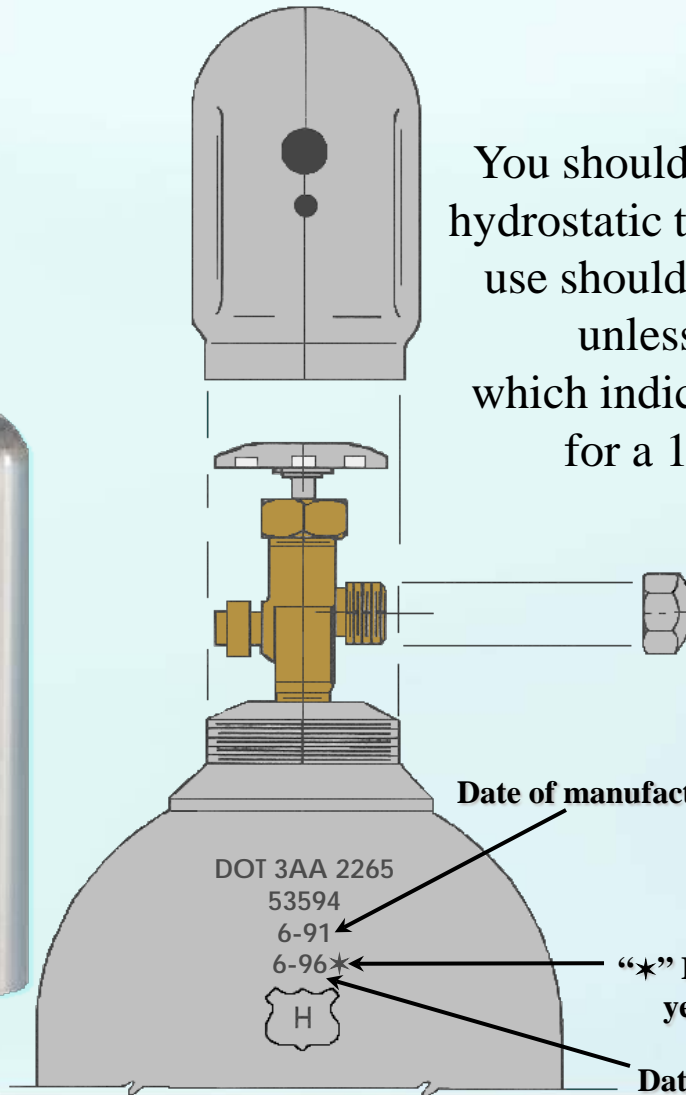
**Does it show signs of deep rusting?**

**Does it contain the correct gas in the designated usage area?**

**Return any cylinders with problems (e.g., cap rusted shut, etc.) to the supplier**



# Inspecting & Testing Compressed Gas Cylinders



You should also inspect the cylinders hydrostatic test dates. Most cylinders in use should be retested every 5 years unless marked with a “★” which indicates the cylinder qualifies for a 10 year retest interval.

Date of manufacture and original hydrostatic test date

DOT 3AA 2265  
53594  
6-91

“★” Indicates cylinder qualifies for 10 year hydrostatic retest interval

Date of first 5 year hydrostatic retest



# Inspecting & Testing Compressed Gas Cylinders

For cylinders containing flammable or combustible gases, use an approved flammable gas detector. Test systems that carry toxic or corrosive gases with inert gas before operating. After you complete the tests, place a tag on the regulator with your name and test date.



# Safely Store Compressed Gas Cylinders

**Store cylinders in the right environment.  
Storage space and floor should be:**

Well ventilated

Free of flame, sparks, or electrical circuit

Level, fireproof, and dry

Below 125 degrees Fahrenheit

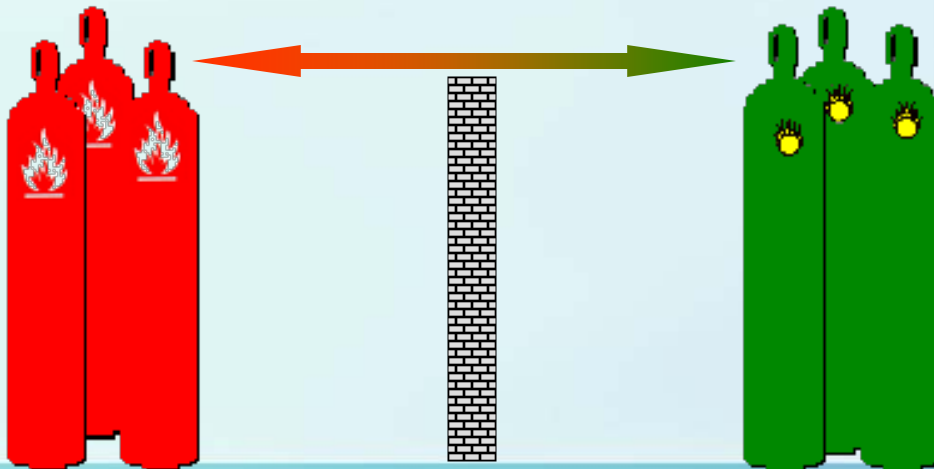
Out of the sun's direct rays if in an extreme climate



# Safely Store Compressed Gas Cylinders

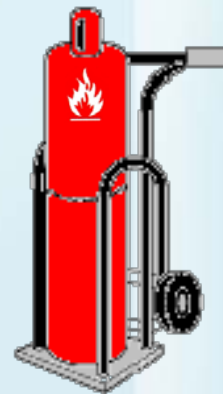
Segregate cylinders by hazardous gases. Incompatible gases must be stored by hazard class in separate areas, even when the cylinder is empty. Separate the incompatible cylinders by:

a distance of at least 20 feet, or  
a five foot firewall with a fire rating of 1/2 hour



# Safely Transport Compressed Gas Cylinders

Many accidents occur while moving or transporting cylinders. Handle cylinders gently. They may look strong and solid, but if a cylinder is damaged it can become an uncontrolled projectile damaging anyone or anything in its path.





# Safely Transport Compressed Gas Cylinders

**Whether you move cylinders short or long distances, follow these guidelines:**

- ① Remove the regulator. Never move a cylinder with the regulator still in place.
- ② Replace the valve protection cap. Never lift a cylinder by the valve or protective cap.
- ③ Secure the cylinder to a suitable hand truck or cart in an upright position.
- ④ Take precautions so cylinders will not fall or strike each other or any other surface. Never roll, drag, or slide the cylinder.





# Best Safety Practices



- Always read the MSDS before working with a compressed gas.
- Positively identify the gas you are working with.
- Always go through the inspection checklist.
- Be sure the work area is well ventilated.
- Know the emergency procedures for the particular gas being used and the location of the emergency equipment.
- Wear appropriate personal protective equipment.

# The End



For additional questions regarding this presentation call:  
Risk Management at (702)-799-6496