

MAJOR PROGRAM POINTS

"WORKING SAFELY WITH COMPRESSED GAS CYLINDERS"

Part of the "GENERAL SAFETY SERIES"

Outline of Major Points Covered in the "Handling Compress Gas Cylinders" Course

The following outline summarizes the major points of information presented in the course on "Handling Compressed Gas Cylinders". The outline can be used to survey the course before taking it on a computer, as well as to review the course when a computer is not available.

- **Compressed gas cylinders are used in a variety of environments.**
 - To provide fuel for welding.
 - Supplying breathable air.
 - Carrying out laboratory experiments.
- **Storing gases in a cylinder puts them under a lot of pressure.**
 - The gas is constantly trying to push itself out of the cylinder.
 - This can give rise to accidents or releases.
- **If there is a leak, we can find ourselves with a dangerous situation, since gas can flow:**
 - Along work surfaces.
 - Over electrical devices.
 - Past a spark or flame.
- **Three major problems are occurring in these situations:**
 - A leak at the cylinder.
 - Gas being pushed out by the inside pressure.
 - The characteristics of the gas itself (such as flammability) creating a hazard.
- **Even with this potential for danger, we can learn to work with compressed gas cylinders safely.**
 - The process starts by looking at how different types of gases are stored.
- **"Standard Compression."**
 - This squeezes substances into a cylinder, but keeps them in their gaseous form.
 - It is used with Oxygen, Hydrogen and similar substances.

- **Some gases are compressed into a liquid form.**
 - This technique is used for Carbon Dioxide, Propane and other substances.

- **Gases can also be dissolved in a solvent and then compressed.**
 - Acetylene is the only common substance stored this way.

- **The fourth method of compression is to cool a gas into a "Cryogenic Liquid" as it is compressed.**
 - This is often used with Nitrogen and Argon.

- **It is also important to be aware of the types of hazards that various gases themselves have.**
 - Labels and warning signs on the cylinders themselves are helpful here.

- **Many of the gases we work with present special dangers.**
 - Toxic gases like Carbon Monoxide and Phosgene can be poisonous.
 - Many gases are flammable and can be ignited by sparks or other ignition sources.
 - Oxidizers, like Fluorine and Oxygen, can also cause fires and explosions.
 - Corrosives, such as Chlorine, can burn the skin and cause other damage.
 - Some gases, such as Nitrogen and Helium, can push breathable air completely out of a room.

- **Cryogenic liquids (like Nitrogen) have their own special hazards.**
 - They are stored at extremely low temperatures.
 - Direct contact can cause severe burns to the skin.
 - The low temperatures can also make valve washers brittle and cause leaks.
 - PPE like goggles and gloves should be used at all times.

- **Knowing how to properly store compressed gas cylinders is important.**
 - Keep them in cool, dry, well ventilated spaces.
 - Cylinders should be secured, so that they cannot fall or bump into each other.
 - Regulations for securing cylinders can vary from state to state (ask your supervisor if you have questions).
- **There are other storage considerations that you should know about as well.**
 - Keep cylinders out of direct sunlight.
 - Keep flammables and oxidizers separated (in different rooms, or at least 20 feet apart).
 - Also keep flammables and oxidizers away from sources of ignition.
- **Knowing how to handle compressed gas cylinders safely is also important.**
 - Make sure the cylinder's "safety cap" is on (it protects the valve).
 - Don't drag cylinders.
 - Don't roll them by hand either (except for short distances).
 - Use a "cylinder hand cart" whenever possible.
 - If a cylinder begins to fall, don't try to catch it.
- **Once a cylinder has been delivered to its destination, you should know the procedures for correctly hooking it up.**
 - Take the safety cap off (but don't try and force it with a screwdriver or bar.)
 - Know the various devices you will have to work with when hooking up a cylinder.
- **"Regulators" are very important.**
 - They control the rate at which gas is delivered from the cylinder.

- **A "CGA Fitting" should be permanently attached to the regulator.**
 - It connects to the cylinder valve and allows gas to be withdrawn from the cylinder.
 - There are specific CGA fittings for specific gases.
 - Don't try to force CGA's to fit other connectors (you might be hooking up the wrong type of gas).
- **"Pressure Relief Devices" (PRD's) provide another safeguard.**
 - They allow for the controlled release of a gas when it is heated by a fire or in other emergency situations.
 - This keeps the cylinder from exploding.
 - Toxic/poisonous gases do not have PRD's because of their own hazards.
- **"Flame Arrestors" prevent "flashback".**
 - Flashback occurs when fire is accidentally drawn back into the cylinder.
 - It can cause explosions or other incidents.
- **Once you are finished hooking up a cylinder, check the fittings and valves for leaks.**
 - Cover surfaces with a diluted soap solution.
 - If bubbles appear, there may be a leak.
 - Corrections may be as simple as tightening a valve with a wrench.
- **If you suspect a cylinder has a leak, you should do several things:**
 - Alert other workers.
 - If the gas is flammable, don't unplug equipment or turn off lights (this could generate sparks).
 - Notify your supervisor.
 - Consult the gas's MSDS for additional information.
 - Evacuate the area, if necessary.
 - Follow your facility's Emergency Plan.

- **If you must enter a work area where a gas leak has taken place, take appropriate precautions.**
 - Wear a respirator (some situations may require SCBA's).
 - Always have a back-up crew.
 - If a problem (such as a fire or explosion) occurs, take action according your facility's Emergency Plan.

- **Be aware of the properties and hazards associated with the gases you use.**

- **Exercise caution during the transport and storage of cylinders.**

- **Read tags and labels when you are working with compressed gas cylinders.**

- **Check for leaks and other defects when you are hooking up a cylinder.**

- **Follow your facility's standard operating procedures.**