Welcome to the

OE MEYER CO
An Employee Owned Company

Compressed Gas & Equipment Safety Seminar

SuperFlash® COMPRESSED GAS EQUIPMENT

OE MEYER CO
An Employee Owned Company

Garfield Heights, OH

Seminar available at your location

Email prevolinsky@oemeyer.com for info.

Introduction

- My name is Dave Marquard, founder & owner of Superflash Compressed Gas Equipment
- I am also a former public official, Chairman of the Avon Lake Municipal Utilities serving six counties, 680 square miles and over 200,000 customers

Your most valuable resource?

- Is your talented work force
- This seminar will help you protect this most valuable resource
- Who must be trained?
- Anyone who touches or supervises the storage of compressed gases

References and Credits

- ANSI Z49.1: (Current Edition)
- PA Department of Environmental Protection, Bureau of Deep Mine Safety
- IBEDA Inc.
- OSHA
- US EPA
- Compressed Gas Association (CGA)

Compressed Gas Association (CGA)

Active Member Company

- 100+ Million Cylinders & Cryogenic Vessels in Use in the U. S. A.
- Safety Record is Excellent
- Safety
- Self-regulation

SuperFlash®
COMPRESSED GAS EQUIPMENT

IBEDA® INC.
CERTIFIED SAFETY worldwide!

Neustadt Wied, Germany

- *Manufacturing facilities in the U. S. and Europe*


Westlake, OH

Serve compressed gas users in 100 countries

Just a note

- **This program is informational only and does not certify or qualify anyone in the use of Oxy-Acetylene or Oxy-Fuel Gas burning or welding.**
- **For the proper use of your equipment, please contact your supplier or manufacturer**

Which Gas is the Most Hazardous in the Work Place?

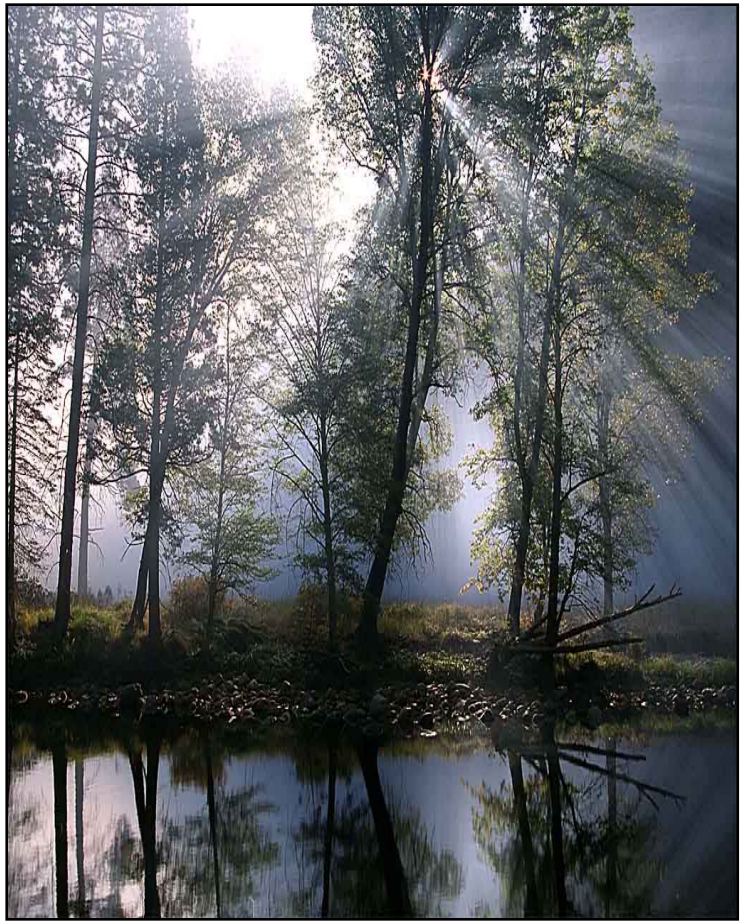
- Propane
- Natural Gas
- Oxygen
- Air
- Acetylene

Answer: They are all hazardous!

- Safety Training is Essential
- Oxygen is the most hazardous because it is most misunderstood.
- Many employees think “Oxygen is ordinary air”. It is most assuredly NOT AIR!

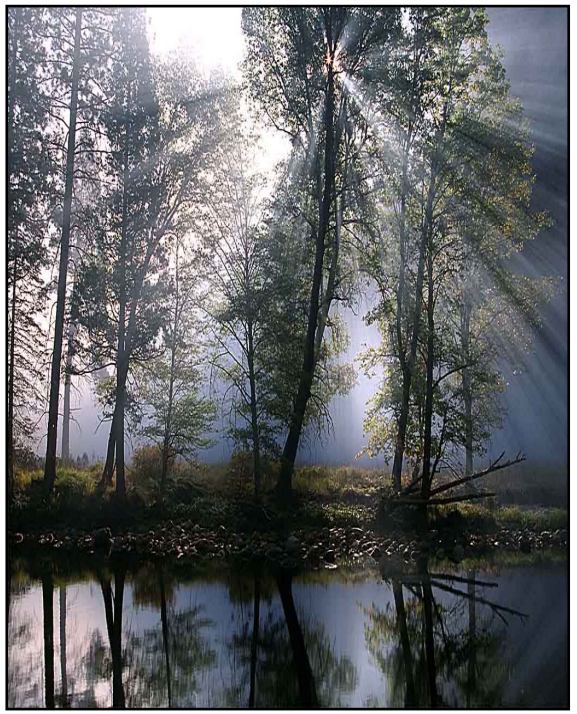
Properties of Oxygen

- Oxygen is colorless, odorless, tasteless, it supports life and combustion. It makes up about 1/5 of the air we breathe (20.99%).

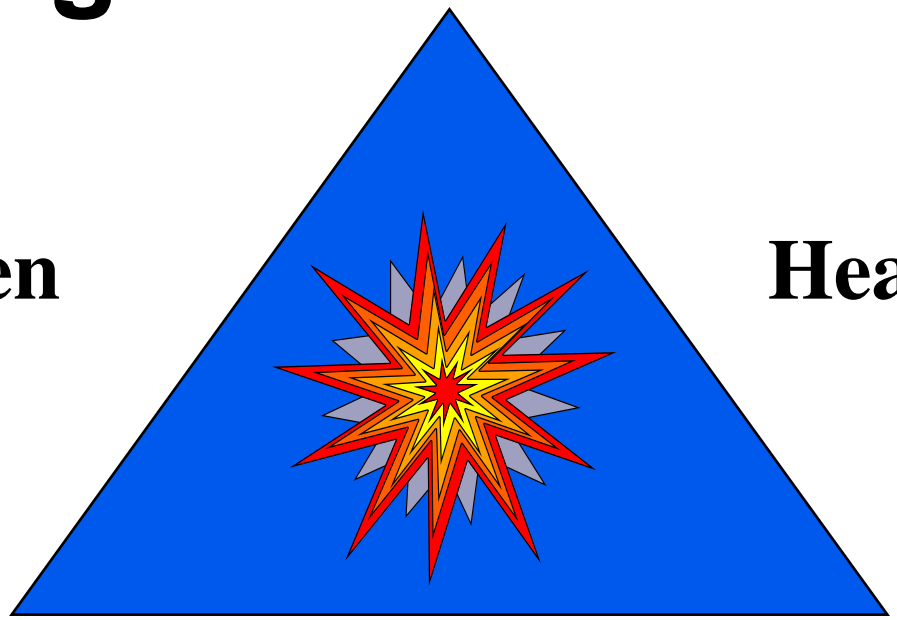


Major Uses of Oxygen

- **Maintenance**
- **Heating, welding & cutting**
- **Combustion Supporting (used extensively in the manufacture of steel and in space program)**

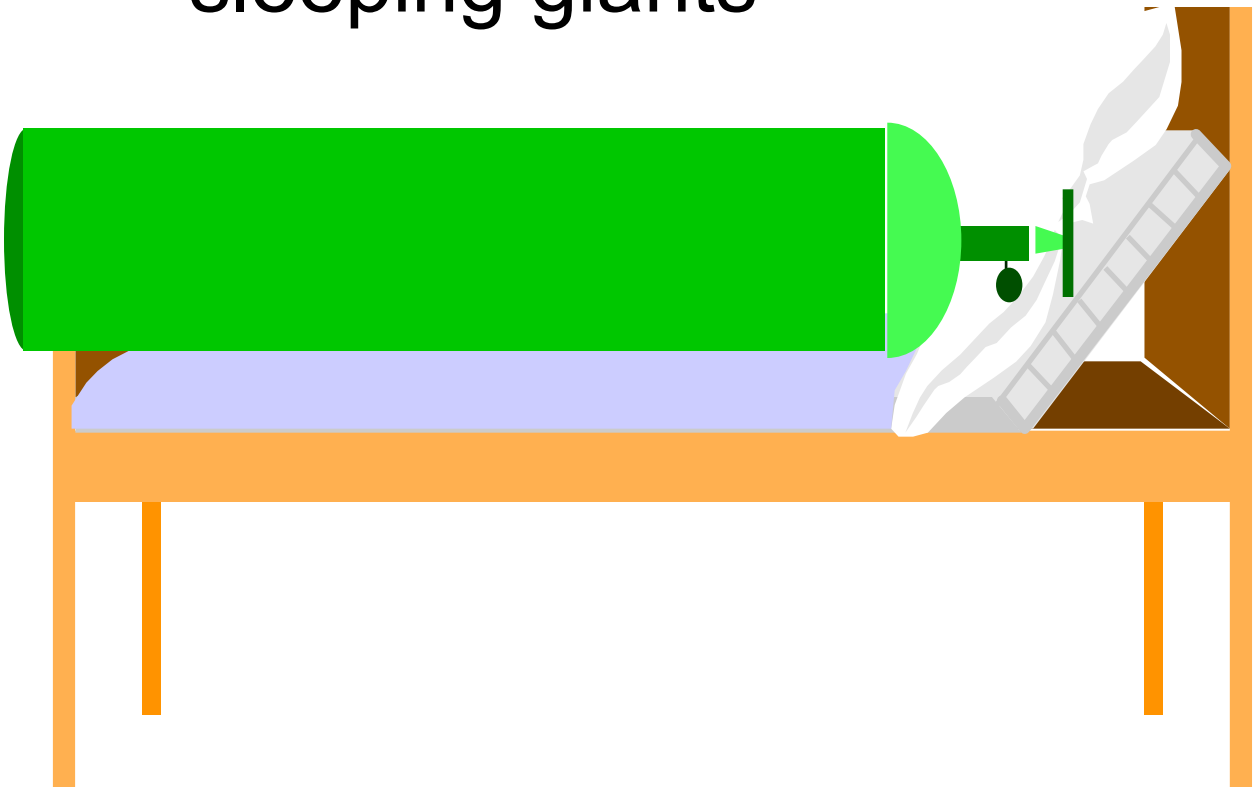


Triangle of Combustion



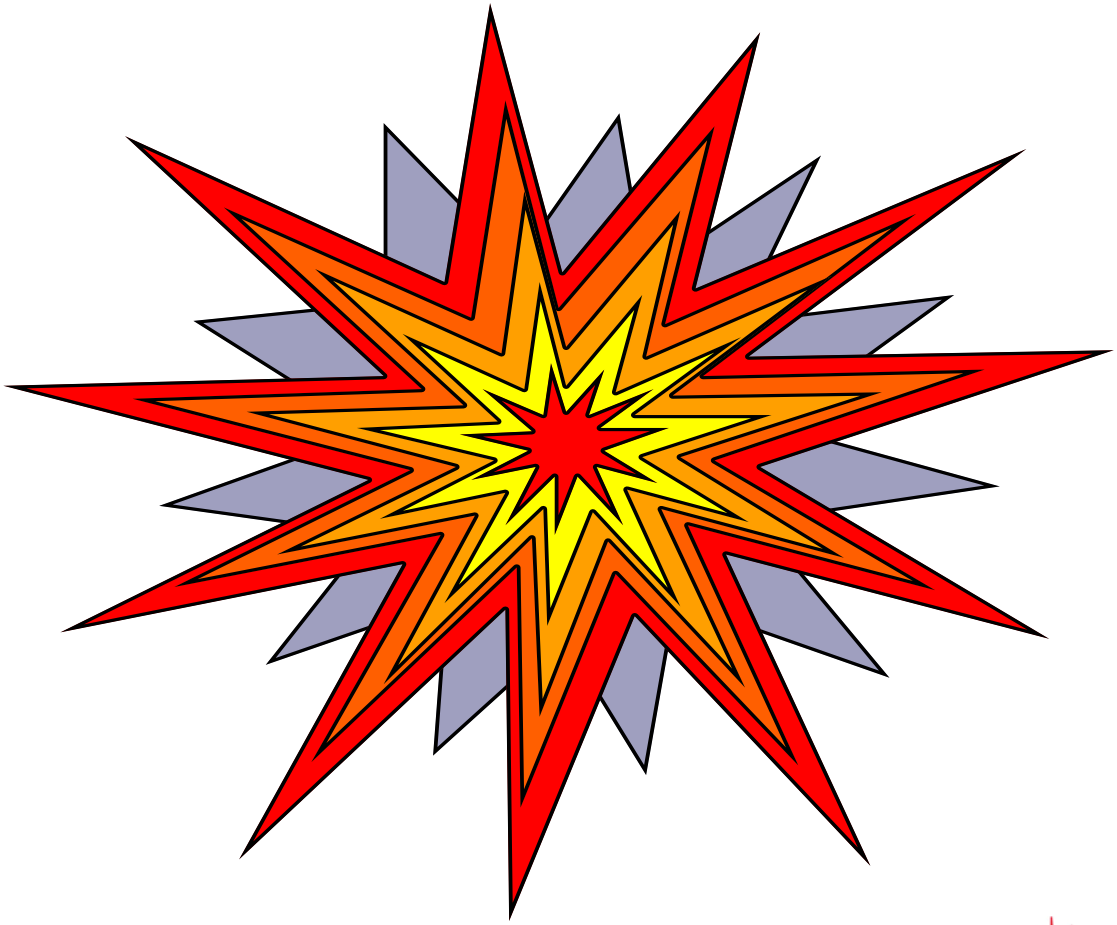
- Oxygen lowers the kindling point, increases the speed, and temperature of combustion.

High pressure cylinders are “sleeping giants”



Hazard of recompression

- Open all high pressure valves slowly.



Warning!

- **USE NO OIL in, on, or around oxygen.**
- **Most equipment is lubricated for life.**
- **Only use oxygen compatible leak testing solution such as Applied #1109-1023 and sealants like Applied Telfon tape #1100-9910 which meet military specifications for oxygen compatibility**

Never use oxygen……

- in pneumatic tools- the oil and the gas pressure friction can cause a fire or explosion
- in oil pre-heating burners- these burners are set to burn with 21% oxygen to air ratio
- to start internal combustion engines- gasoline is flammable enough with 21% oxygen available
- to blow out pipelines- Leftover flammable or combustible vapors may still be present to cause an explosion
- to dust off clothing or work area- the oxygen will remain present in the cloth fibers causing them to be more flammable
- to create pressure
- for ventilation

Something to think about……

Every time you use the oxy-acetylene or oxy-fuel gas equipment , if safety guidelines are not followed, it would be the same as handling TNT ready to go off…….

Now let's talk about other gases

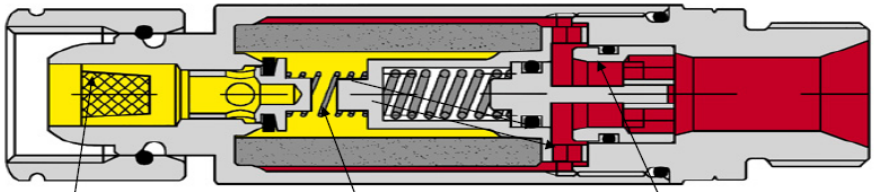
Opportunity to Improve Safety and Productivity

Only 5% of Torches & Regulators are Equipped with Flashback Arrestors

SuperFlash™
COMPRESSED GAS EQUIPMENT

Flashback Arrestors stop flashbacks, reverse flow of gases, and hose burn backs (regulator type only) with:

- Check valve stops reverse flow of gases



- Flame barrier stops flashbacks
- Stainless inlet screen helps keep dust and dirt out
- In regulator type flashback arrestors thermal shut off is included to stop hose burn from reaching cylinders and pipe lines

Frequently Asked Questions

- **<u>Why</u> do I need flashback arrestors?**
- **<u>Why</u> aren't they built in to the torch or regulator?**
- **<u>Why</u> aren't they required by OSHA?**

What is acetylene 

- **Acetylene is a compound of Hydrogen and Carbon (C_2H_2) a member of the hydrocarbon gases**
- **Explosive range is 3.0 to 93%**
- **Needs only 10% of oxygen to ignite**
- **Produced when calcium carbide is mixed with water**
- **It is an unstable gas, will violently decompose when in a pure state above 15 psi**
- **Has a burning temperature of 4,600° F, 5,700° F when burned with oxygen**
- **Auto-ignition temperature is 763° - 824° F, this means if acetylene reaches 30 psi in a free state, it can explode by itself without a spark or flame being present**
- **Remember, acetylene is a very dangerous gas**

Why doesn't acetylene explode in the bottle

- **Acetylene burns in air readily, and is most safely hand- led/ stored in cylinders filled with crushed firebrick wet with acetone.**

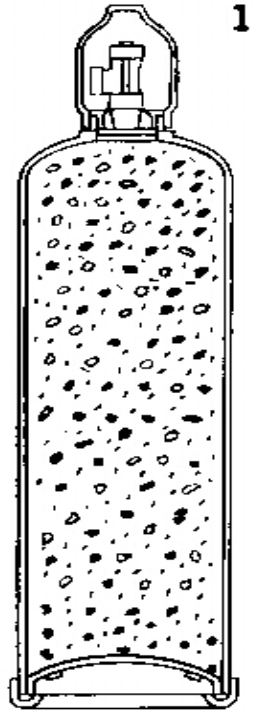
- **Acetylene happens to dissolve readily into acetone, and the dissolved gas is no longer in contact with gaseous O_2 (which does not tend to dissolve in acetone) and therefore is not as prone to decomposition by O_2.**

- **The firebrick also helps by minimizing the free volume of the cylinder, cooling and controlling any thermal decomposition before it gets out of control (each decomposition of acetylene gives off heat).**

- ***Acetylene cylinders must, therefore, be refilled only by authorized gas distributors. Acetylene cylinders must never be transfilled.***

How are acetylene bottles constructed ?

- Usually are steel construction
- Filled with a porous material to allow the acetone to dissolve the acetylene, which makes it stable
- Porous filler(8-10%), Acetone(42%)
- Acetylene gas(36%),
- Reserve volume-70° F(10-12%)
- Never allow a tank to go empty
  - Oxygen may back pressure into the bottle
- Comes in various sizes
- Must always be stored upright
  - This prevents the acetone and acetylene from separating
- Should not be stored below freezing
  - Acetone may come out instead of acetylene and may clog the regulators



What are alternate fuel gases?

- Natural gas
  - Cadillac of fuels available at Kia prices
  - Requires 1:1.6 parts of oxygen
- Propane
  - 2,642 BTU vs. Acetylene 1,642 BTU
  - Less costly than Acetylene
  - Heavier than air
- MAPP and other fuel gases

Care & maintenance of the Gas Regulators

The internal working parts of the regulator are precision units. Only qualified technicians should clean or repair a regulator

The Low pressure gauge

- Indicates the delivery pressure to the hoses & torch

The High pressure gauge

- Indicates the pressure from tank

The Inlet Connections

- Oxygen are right hand thread/Acetylene are left hand thread
- Keep free of oil, grease, & dirt

The Pressure adjusting screw

- Turning clockwise allows the gas allows to flow
- Turning counterclockwise reduces or stops the gas flow

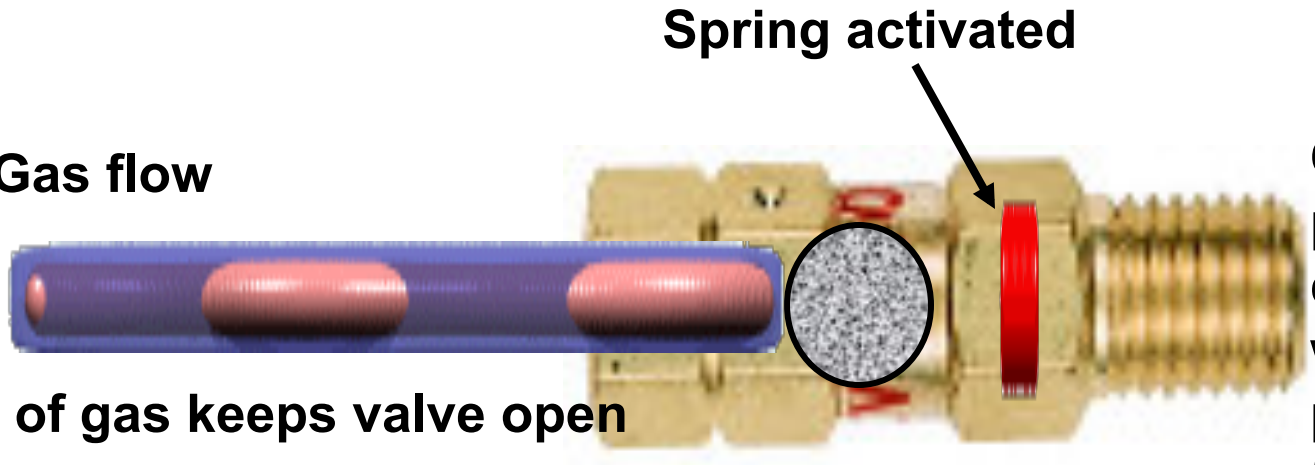
Some more info on regulators

- ***Warning -Always keep the regulator free of oil, grease and other flammable substances***
- ***Never use oil or grease on the regulator, cylinder or manifold connection***
- ***DO NOT change the inlet connection on a regulator in an attempt to use the regulator for a different gas service***

Never stand in front or behind a regulator when opening the cylinder valve

Check valves

- *The purpose of an internal check valve is to reduce the possibility of reverse flow gas.*
- *It is not intended to act as a fire stop or flashback arrestor!*
- *Ensure that the internal check valves are working properly by testing at least every six months, more often if the hoses are frequently removed from the torch. No inlet filter.*



The Hoses

- **The hoses are usually color coded, but not always**
  - **Oxygen(green)**
  - **Acetylene(red)**
  - **Be careful not to use other hoses, such as air lines, LP gas, etc.**
- **They are neoprene over braided inner section**
  - **Be careful around sharp objects, they can be cut very easily**
- **They are constructed of flame retardant materials, but will burn if there is a flashback or exposed to sustained heat**
- **Hoses are graded**
  - **Make sure you are using the right hose for the right gas**

More hose stuff

- ***Keep welding hoses clear of any failing metal, slag or sparks.***
- ***Never allow hoses to become coated with oil, grease or dirt. Such coatings could conceal damaged areas.***
- ***Examine the hoses before attaching to welding torch handle or regulators.***
- ***If cuts, burns, worn areas or damaged fittings are found, replace the hose.***
- ***Completely replace welding hose if it contains multiple splices or when cracks or severe wear is noticed.***

What size cutting-tip do I need?

The type of torch you are using and the thickness of material being cut determine the proper size cutting-tip for use in oxy-acetylene flame cutting

- ***Always make sure your equipment is rated for the size tip you have selected.***
- ***A tip with too much capacity for the equipment can starve or choke the tip. This causes overheating of the head and a flashback may result.***
- ***A damaged seating surface on either the tip or the head can create a dangerous condition, resulting in a fire or flashback. This may damage the cutting attachment.***
- ***If the seating surface of a tip becomes damaged, DO NOT use it. Discard the damaged tip.***
- ***If the head requires repair, take the torch to a qualified repair technician.***

Laws & Regulations

for

Oxy-Acetylene & Oxy Fuel Gas Use

MSHA Regulations

OSHA Requirements

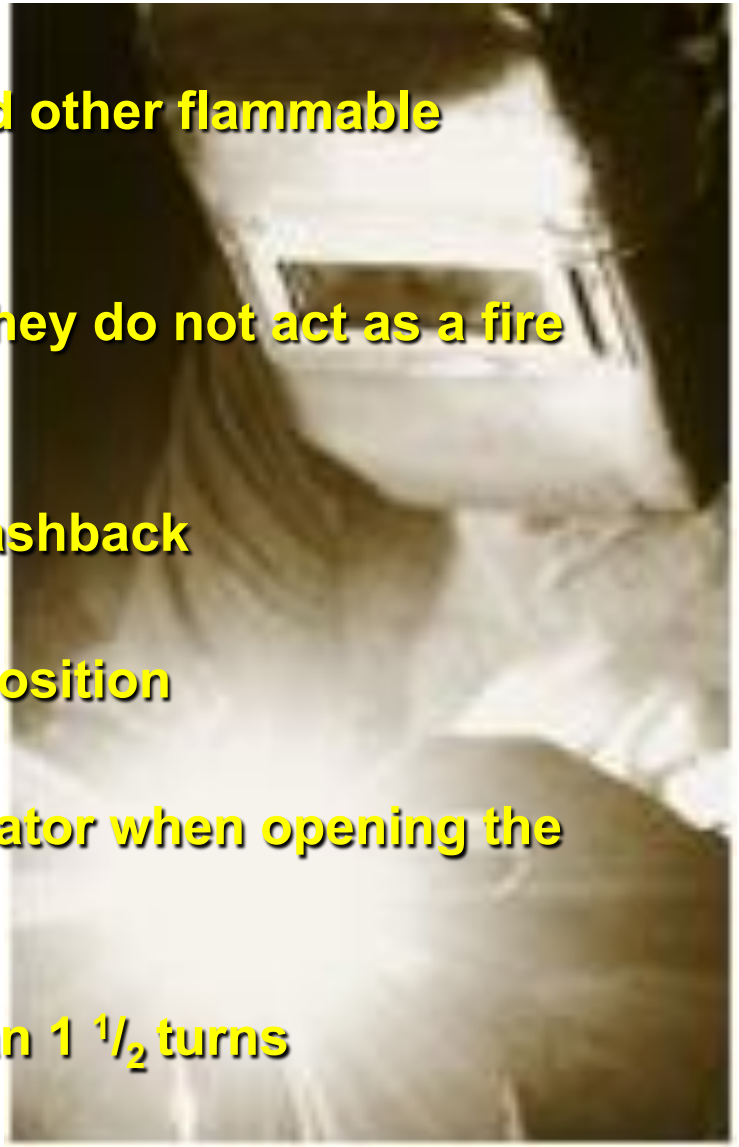
ANSI, AWS, and CGA

Let's Finish With Some Final General Safety Tips

- Never allow oxygen to contact oil, grease or other flammable substances
- Never mix brands
- Purge the lines before and after usage
- Always wear protective clothing
- Use proper eye protection

- If flashback occurs, immediately turn off the O_2, then the acetylene, and allow unit to cool
- Always work in a well ventilated area
- Always light the acetylene first
- Oxygen cylinders must be opened the whole way
- Use an approved striker, never use matches or cigarette lighter
- Use the proper regulator for each specific gas
- Only qualified technicians should repair a regulator
- Keep regulators free of oil, grease and other flammable substances

General Safety Tips



- Keep regulators free of oil, grease and other flammable substances
- Check valves stop reverse gas flow, they do not act as a fire stop
- Never starve a tip, this can cause a flashback
- Always keep cylinders in an upright position
- Never stand in front or behind a regulator when opening the cylinder valve
- Do not open acetylene valve more than 1 $^{1}/_{2}$ turns
- Always make sure area is safe and flammable free

Safety Checklist for Getting Started

What is the necessary safety equipment you need?

•Proper Eye protection

•Appropriate gloves

•Clothing free of grease & oil

•Clean work area

•Proper Task Training

•Fire extinguisher

Frequently Asked Questions

- **Are flashback arrestors expensive?**
- **Why is high gas flow capacity important?**


Thank you for attending the
O. E. Meyer Safety
Seminar