

MSA FACILITIES SAFETY AND HEALTH INSPECTION PROGRAM

Compressed Gases



Approved for Public Release;
Further Dissemination Unlimited

Compressed Gases

At the completion of this unit you shall be able to:

1. Utilize section M of the Safety and Health Hazard Inspection Program Checklist to identify compliant and non-compliant safety behaviors.
2. Identify areas of concern requiring immediate action to mitigate or prevent a possible injury.

Please use "Slide Show" to properly view this presentation!

Compressed Gases

- ▣ This section is concerned with the proper control, storage and use of compressed gases in the workplace.



Compressed Gases

- Section M of the checklist contains up to 10 items. Let's take a closer look at these.

MSA GENERAL INDUSTRY-BASED SAFETY AND HEALTH
HAZARD INSPECTION CHECKLIST

No.	Inspection Observations	Compliant?	See Comments (indicate with X)
		Y•N•N/A	
5	Universal Waste Lamps, Batteries, etc. are being managed according to WAC 173-303-573 (22) (c) and the CCRC Management Plan requirements.		
6	Chemical spill kits are available and properly stocked.		
7	Satellite Accumulation Area Containers are at or near the point of generation, and being managed according to WAC-173-303-630 and MSC-PRO-15333.		
8	Applicable Material Safety Data Sheets (MSDS) are available and readily accessible for employees to review.		
9	Hazardous material containers are properly labeled and stored including secondary containers.		
10	Liquids are stored in approved storage cabinets and containers.		
11	Flammable and combustible storage quantity limits are not exceeded.		
12	Storage areas are bonded (if required), ventilated, and protected from physical damage, etc.		
13	When transferring flammable liquids, containers are bonded and grounded.		
14	Combustible waste is stored in closed containers and disposed of when full.		
15	Oil or used shop rags are collected in closed metal containers and emptied as required.		
16	Other.		
M	COMPRESSED GASES (Including LPG)		
1	Compressed gas cylinders (full or empty) are stored as designed (horizontal/vertical) and secured with protective caps in place.		
2	Valves are closed on cylinders not in use.		
3	Storage areas are clearly identified, properly constructed, and segregated.		
4	Compressed gas cylinder content is clearly identified.		
5	Compressed gas cylinders are protected from high temperatures (exceeding 125 degrees F.) and weather elements (ice, snow, standing water).		
6	Flammable gas systems are grounded and bonded.		
7	Gas piping is labeled for type of gas and gas pressure.		
8	Compressed Gas Cylinders are stored separately from flammable materials such as gasoline.		
9	Compressed Gas Cylinders containing flammable gases are stored in ventilated locations.		
10	Other.		
N	SPRAY FINISHING USING FLAMMABLE and COMBUSTIBLE MATERIALS		
1	Forced ventilation is provided for the area.		
2	Spray booth airflow is not obstructed.		

Compressed Gases

1. Compressed gas cylinders (full or empty) are stored as designed (horizontal / vertical) and secured with protective caps in place.
2. Valves are closed on cylinders not in use.
3. Storage areas are clearly identified, properly constructed, and segregated.
4. Compressed gas cylinder content is clearly identified.
5. Compressed gas cylinders are protected from high temperatures (exceeding 125 degrees F.) and weather elements (ice, snow, standing water).
6. Flammable gas systems are grounded and bonded.
7. Gas piping is labeled for type of gas and gas pressure.
8. Compressed Gas Cylinders are stored separately from flammable materials such as gasoline.
9. Compressed Gas Cylinders containing flammable gases are stored in ventilated locations.
10. Other.

Compressed Gases

1. Compressed gas cylinders (full or empty) are stored as designed (horizontal / vertical) and secured with protective caps in place.
 - This item deals with ensuring that the compressed gas bottles are stored with the protective caps installed. This is to ensure that the closure valve will not be damaged.



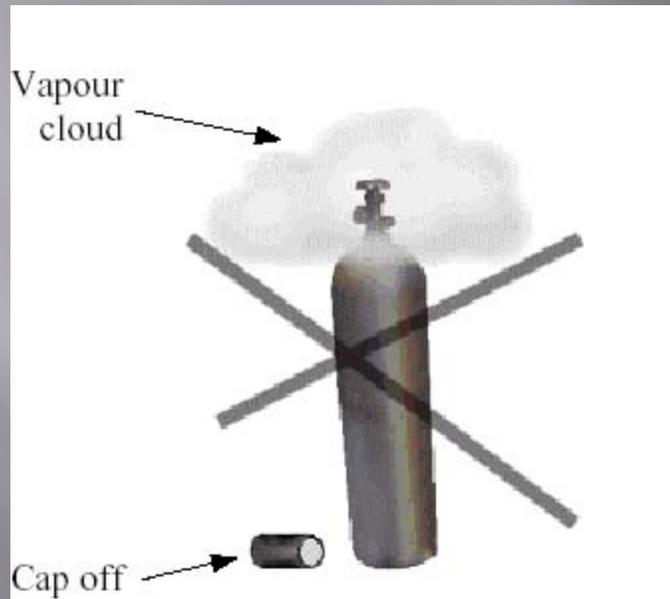
Compressed Gases

1. Compressed gas cylinders (full or empty) are stored as designed (horizontal / vertical) and secured with protective caps in place.
 - A compliant rating on this item would indicate that all cylinders “not in use” have their caps installed.
 - “Not in use” could also include cylinders on welding carts that have regulators attached but are not being used on that shift.....



Compressed Gases

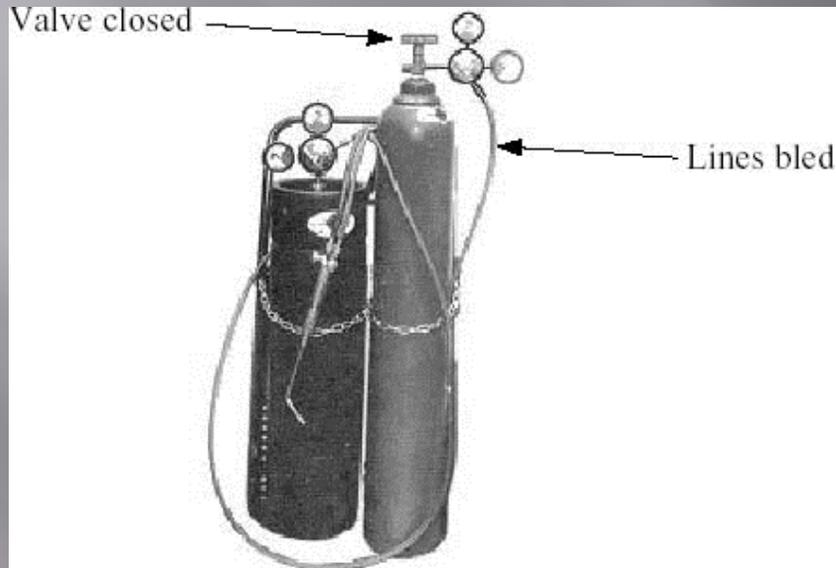
1. Compressed gas cylinders (full or empty) are stored as designed (horizontal / vertical) and secured with protective caps in place.



- A non compliant rating would indicate that a cylinder was stored without it's safety cap.
- Bear in mind that some cylinders (ie medical oxygen in EMT kits) do not have safety caps.

Compressed Gases

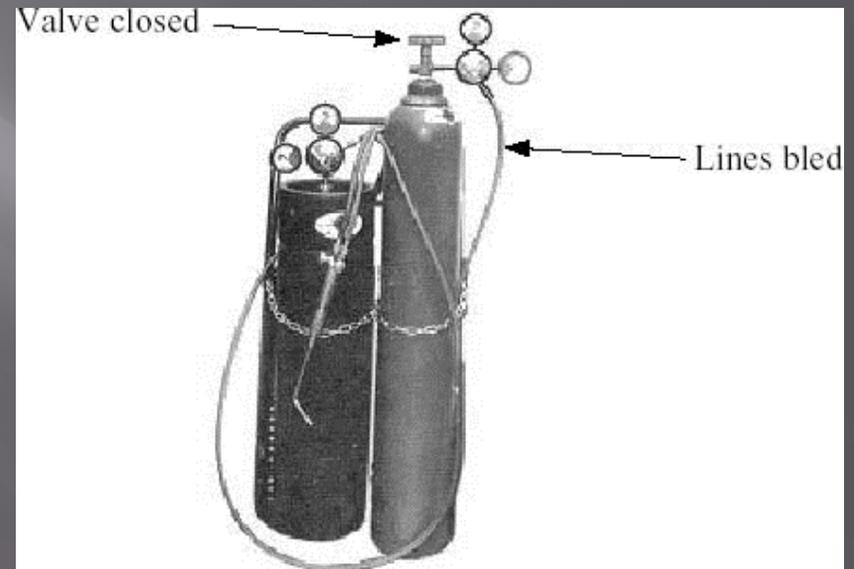
2. Valves are closed on cylinders not in use.



- This item deals with ensuring that if a gas is not being used, you want to ensure that the isolation valve on the cylinder is closed. This reduces the chance of a leak or a rupture in the hose that could create serious safety issues.

Compressed Gases

2. Valves are closed on cylinders not in use.
 - ▣ A compliant rating on this item would indicate that all cylinders “not in use” have their valves closed.
 - ▣ “Not in use” could also include cylinders on welding carts that have regulators attached but are not being used on that shift.....



Compressed Gases

2. Valves are closed on cylinders not in use.
- ▣ A non compliant rating on this item would indicate that one or more cylinders “not in use” do not have their valves closed.



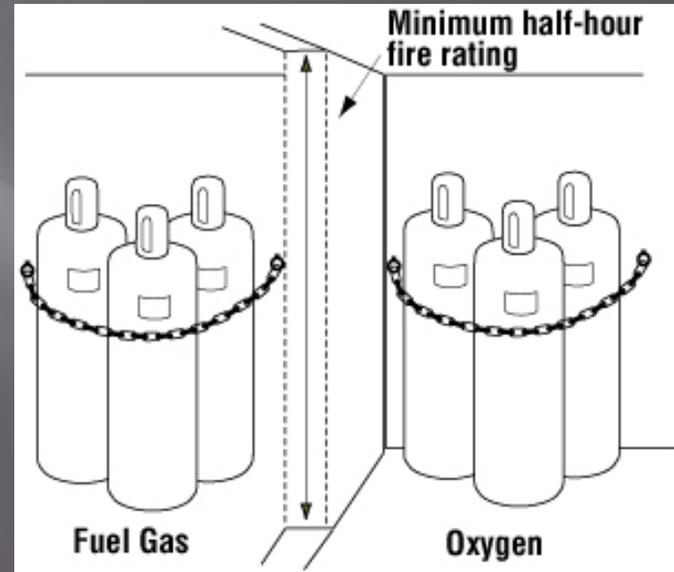
Compressed Gases

3. Storage areas are clearly identified, properly constructed, and segregated.
- The purpose of this item is to ensure that compressed gas cylinders are properly and safely stored.
 - Some of the particular concerns now follow.



Compressed Gases

3. Storage areas are clearly identified, properly constructed, and segregated.
 - ▣ Are cylinders flammable gases and oxidizers separated by either a 20 foot distance or by the use of ½ hour rated 5 foot tall barrier?



Compressed Gases

3. Storage areas are clearly identified, properly constructed, and segregated.
 - ▣ Are cylinders flammable gases and oxidizers separated by either a 20 foot distance or by the use of ½ hour rated 5 foot tall barrier?



Example

Compressed Gases

3. Storage areas are clearly identified, properly constructed, and segregated.



- ▣ Are all of the bottled secured properly either in carts or with chains? Bear in mind that Acetylene bottles ARE NOT to be stored horizontally!



Compressed Gases

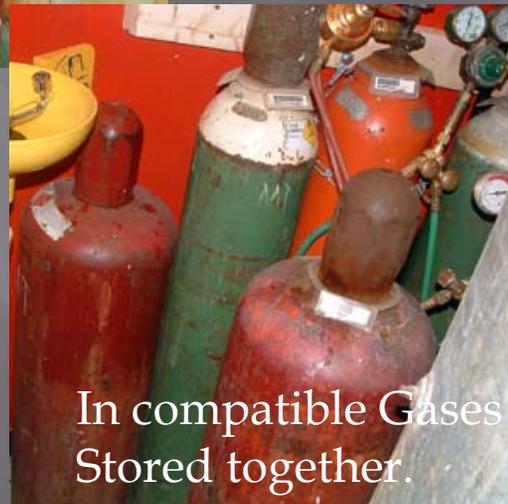
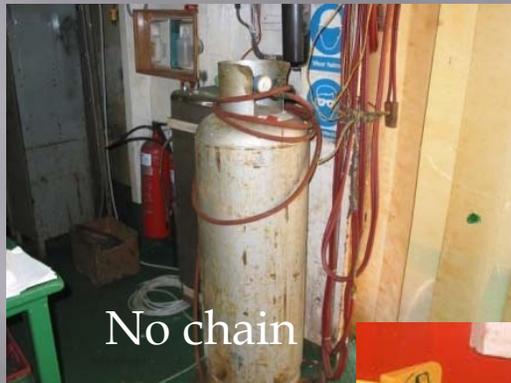
3. Storage areas are clearly identified, properly constructed, and segregated.
 - ▣ A compliant rating on this item would indicate that the bottles were stored properly in clearly identified areas.



Compressed Gases

3. Storage areas are clearly identified, properly constructed, and segregated.

- ▣ A non compliant rating would indicate that there were issues regarding the storage of the gas bottles.



Compressed Gases

4. Compressed gas cylinder content is clearly identified.
- The purpose of this item is to verify that each cylinder is readily identified as to its content.
 - This information is necessary to allow us to know what type of safeguards are necessary to protect employees from fire, toxic gases, or undesirable chemical reactions.



Compressed Gases

4. Compressed gas cylinder content is clearly identified.
- This identification can be as a part of the tag or labels on the cylinder, painted on the cylinder, color of the cylinder, or even stamped into the cylinder.



Compressed Gases

4. Compressed gas cylinder content is clearly identified.
- A compliant rating would indicate that the cylinder content is clearly identified



Compressed Gases

4. Compressed gas cylinder content is clearly identified.

- A non compliant rating would indicate that the cylinder contents are not clearly identified.



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Compressed Gases

5. Compressed gas cylinders are protected from high temperatures (exceeding 125 degrees F.) and weather elements (ice, snow, standing water).
 - ▣ This item deals with the environment where the cylinders are being stored.
 - ▣ Many of the gases bottles may react with both excessive heat (pressure buildup could cause a bottle failure) and heat (the liquid in the bottle could freeze and cause delivery/reaction problems.
 - ▣ Storage in areas where water and snow can collect can cause premature rusting/thinning of the cylinder walls.



Compressed Gases

5. Compressed gas cylinders are protected from high temperatures (exceeding 125 degrees F.) and weather elements (ice, snow, standing water).
- A compliant rating on this item would indicate that the bottles were stored in an environmentally compatible area.



Compressed Gases

5. Compressed gas cylinders are protected from high temperatures (exceeding 125 degrees F.) and weather elements (ice, snow, standing water).
- A non compliant rating would mean that the cylinders were located in areas where the environment could damage the bottle or the product.



Compressed Gases

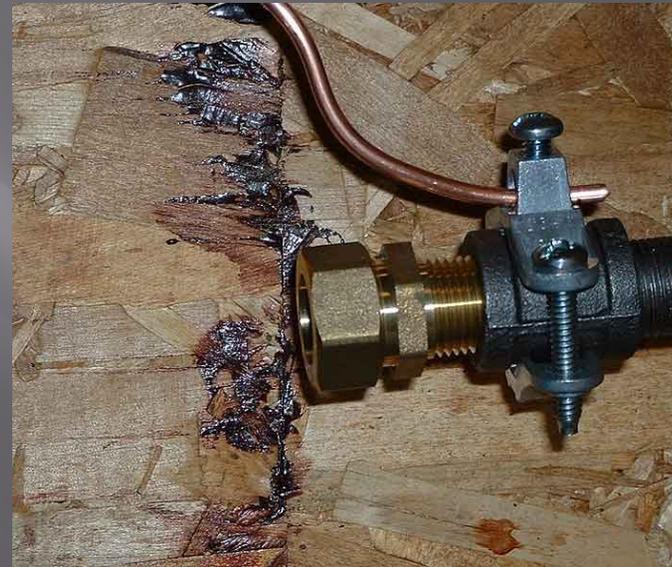
6. Flammable gas systems are grounded and bonded.
 - This item is to ensure that installed flammable gas systems are properly grounded and bonded.
 - This means that we have installed the system to ensure that the piping and gas bottles are protected from static charge buildup (during refilling) and from possible lightning strikes.



Compressed Gases

6. Flammable gas systems are grounded and bonded.

- A compliant rating would indicate that the installed systems are properly bonded.
- A non compliant rating would indicate that the grounding cables were broken, the bonding jumpers were missing, or other issues that could create an unsafe condition.
- Please contact your OHS group if you have any questions regarding bonding/grounding.



Compressed Gases

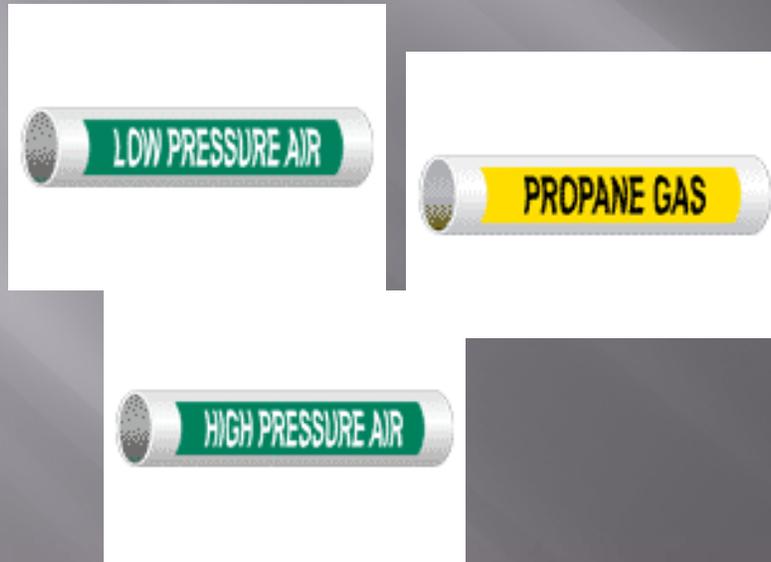
7. Gas piping is labeled for type of gas and gas pressure.



- This item is concerned with installed gas piping systems. Does the piping identify the type of gas and the pressure of the gas? This information is necessary to safely work around this piping and it's associated equipment.
- We have the potential in our facilities for compressed air at both high and low pressures as well as propane systems for the generators.

Compressed Gases

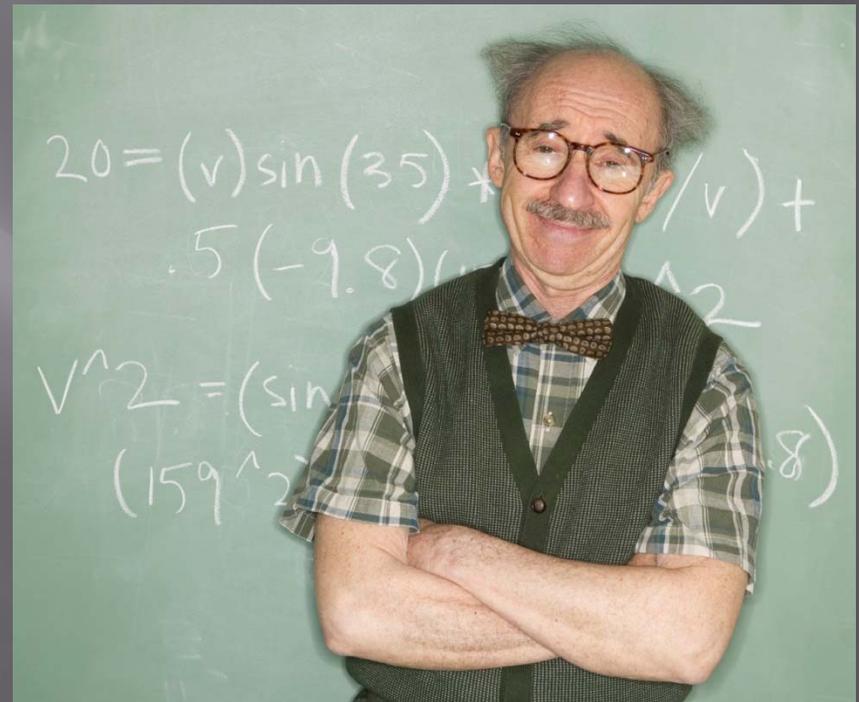
7. Gas piping is labeled for type of gas and gas pressure.



- ▣ A compliant rating would indicate that the piping systems are correctly marked with both type of gas and pressure.
- ▣ A non compliant rating would indicate that the piping did not meet this requirement

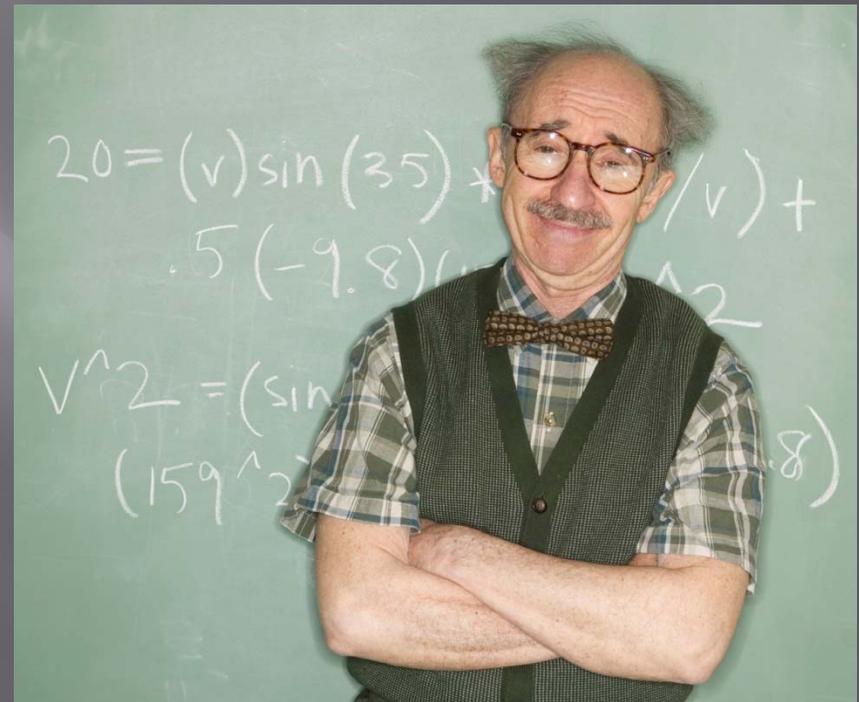
Compressed Gases

8. Compressed Gas Cylinders are stored separately from flammable materials such as gasoline.
 - ▣ This item is to ensure that compressed gases are stored separately from flammable materials such as gasoline.
 - ▣ This is true for all compressed gases not just fuel gases or oxidizer gases as well.



Compressed Gases

8. Compressed Gas Cylinders are stored separately from flammable materials such as gasoline.
 - ▣ This separation can be by a 20 foot physical separation or by the use of rated fire wall separation.
 - ▣ If you need additional information on a fire wall or barrier contact the project fire marshal.



Compressed Gases

8. Compressed Gas Cylinders are stored separately from flammable materials such as gasoline.
 - ▣ A compliant rating would indicate this separation exists.
 - ▣ A non compliant rating would indicate that the gas is stored with flammables.



Compressed Gases

9. Compressed Gas Cylinders containing flammable gases are stored in ventilated locations.
 - ▣ Compressed gases by their nature will tend to expand when released from their cylinders.
 - ▣ These gases could be inert (i.e. Nitrogen, Argon) and create an asphyxiation hazard or they could be flammable (i.e. hydrogen, propane) or toxic (i.e. ammonia, chlorine).
 - ▣ The point is that they must be stored such that an leaking cylinder will have any gases released ventilated to prevent a danger to workers or facilities.



Compressed Gases

9. Compressed Gas Cylinders containing flammable gases are stored in ventilated locations.
 - ▣ A compliant rating would indicate that these bottles were stored in a well ventilated location adequate for the type of hazards present.



Compressed Gases

9. Compressed Gas Cylinders containing flammable gases are stored in ventilated locations.
 - ▣ A compliant rating would indicate that these bottles were stored in a well ventilated location adequate for the type of hazards present.
 - ▣ A non compliant rating would indicate that they were stored incorrectly.



Compressed Gases

10. Other.

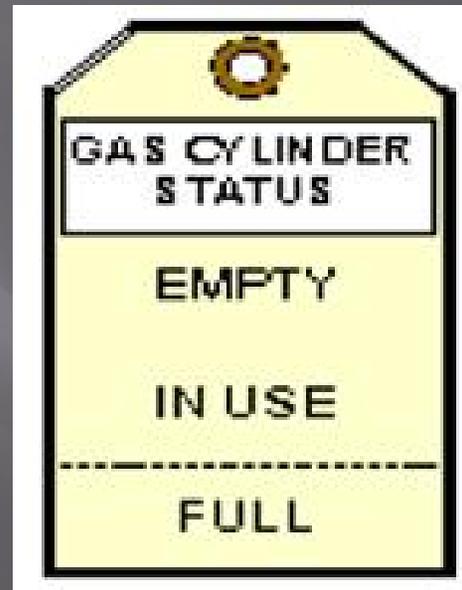
- I'd like to take a moment to point out some fine points you should also look for that weren't covered in the previous items.
- Please note that any of the following items would have to be explained in the comments section of the checklist.

Compressed Gases

10. Other.

- ▣ The standard requires that we note if bottles Empty.
- ▣ This can be done either by using a tag similar to this or by simply writing the letters:

MT or Empty



Compressed Gases

10. Other.



- ▣ Another is that bottles need to be handled either in a bottle cart or in special rigging containers. You may roll a bottle for short distances on the bottom (NEVER on the side), but for longer distances use a cart.

Compressed Gases

10. Other.

- ▣ Another issue is if the gas is flammable or combustible. It needs to have a warning sign against smoking, open flames, or the potential of an significant ignition source on the tank.
- ▣ This sign needs to be obeyed. This is a good behavioral observation.



Compressed Gases

10. Other.

- ▣ Another issue is if the gas is flammable or combustible. It needs to have a warning sign against smoking, open flames, or the potential of an significant ignition source on the tank.
- ▣ This sign needs to be obeyed. This is a good behavioral observation.



Acetylene

Compressed Gases

10. Other.

- ▣ Another issue is if the gas is flammable or combustible. It needs to have a warning sign against smoking, open flames, or the potential of an significant ignition source on the tank.
- ▣ This sign needs to be obeyed. This is a good behavioral observation.



And we have a nominee for the Darwin award.

Compressed Gases

- If at any time you have any questions about how to fill out the form or about the items on the form please contact your OS&H group.

**MSA GENERAL INDUSTRY-BASED SAFETY AND HEALTH
HAZARD INSPECTION CHECKLIST**

Facility: _____	Facility Representative: _____
Date: _____	Team Member: _____
Total Items Reviewed: _____	Team Member: _____
Total Non-Compliant Items: _____	Team Member: _____

No.	Inspection Observations	Compliant? Y·N·N/A	See Comments (indicate with X)
A	FIRE PROTECTION INSPECTION <i>(All issues must be observed as applicable see note 2)</i>		
1	Emergency Lights - Each unit must be operable when tested.		
2	Portable Fire Extinguishers (PFE) - Each unit is properly mounted, an inspection tag is in place and reflects through previous month, the pressure gauge is in the "green" zone (where applicable).		
3	PFE is not obstructed, is visible, and the seal is not broken.		
4	Sprinkler Clearance - Clearance between the sprinkler deflector and the top of any storage is 18 inches or greater.		
5	Fire Riser Pressure Gauge Inspection - Inspect gauges to verify pressure to the building and pressure held in the fire system. Typically both gauges will have similar pressure readings.		
6	Fire Risers - Access to fire system sprinkler risers and other system components must be unobstructed.		
7	Fire Riser Valve Inspection - Check all seals, position and supervision for broken seals or possible tampering.		
8	Post Indicating Valve Inspection - This valve will be located outside of the facility. It must be verified that the window on the side of the valve reads "OPEN".		
9	Exit Signs - Exit signs with an internal lighting source must be checked to ensure all lamps are functional. - Exit signs that use Tritium must be observed that they have not been damaged, all applicable labels are present, the sign has not expired, and it is not covered with another sign.		
10	Fire Doors - Identify that fire doors operate freely and latch securely upon closure. Fire doors must not be propped open.		
11	Ceiling Tiles - Where automatic sprinklers are installed drop ceiling tiles are in place. Missing tiles slow response of fire suppression sprinklers.		
12	Manual alarm stations are easily identified and readily accessible.		
13	Other.		
B	GENERAL SAFE BEHAVIORS		
1	Employees are taking the necessary safety precautions for the work being performed.		
2	Work is being performed such that collocated employees in the area are not exposed to occupational hazards or unsafe conditions.		

1 A-6004-299 (REV 2)

Compressed Gases

Thank you for your time
and desire to help us have
a safer workplace