

CYLINDER STORAGE AND SECUREMENT

INTRODUCTION: Proper loading, unloading and securement techniques can prevent personal injuries, damage to cylinders and other equipment and loss of product. In addition, drivers can be held personally responsible by law enforcement for improper loading and securement.

GOAL: Drivers, helpers and dockworkers should be able to answer questions about key loading and storage issues and demonstrate proper technique.

MEETING PREPARATION: Review the attached summary of Cylinder Storage & Securement Rules. If you nest cylinders, rather than using other securing methods, make copies of the cylinder nesting diagram for distribution to attendees. It is helpful to have a chalkboard or whiteboard to draw the nesting diagrams. If possible, have a delivery truck available for drivers to demonstrate the proper way of securing cylinders. Have the driver explain how they use the lift gate to make sure it follows your company safety practice. Make copies of the quiz that attendees will take at the conclusion of the meeting.

ITEMS TO CONSIDER:

- The FDA requires medical cylinders to be segregated according to full/empty, tested/not tested. If you fill or store medical grade gases, your written Standard Operating Procedures (SOP) must establish these locations and employees must be trained to know exactly where each type of cylinder goes.
- Cylinders left on the edge of the dock by customers create tripping/falling hazards. Someone should be assigned to check this area often.

FOLLOW UP

Periodically review truck bindings to determine that employees are using proper number of straps, placing them at the proper heights, etc. Inspect bindings regularly to ensure they are in proper operating condition. Inspect cylinder storage areas periodically to ensure industry safe storage recommendations are met. Refer to GAWDA OSHA Manual, Section 30 for safe storage guidelines.

CYLINDER STORAGE & SECUREMENT RULES

KEY POINTS TO DISCUSS

IN TRANSPORT VEHICLE

- Cylinders (and other cargo) must be secured relative to the vehicle and relative to one another.
- Small cylinders (B, MC, E, etc) must also be secured. If they are shipped in a cart with individual slots, the cart only needs to be secured to the vehicle. If the cylinders are shipped in a cart without individual supports, the cylinders must be secured to the cart and then the cart must be secured to the vehicle. If the cylinders are shipped in a box or crate, again the cylinders must be secured inside the box or crate and then the box or crate must be secured to the vehicle. Covers on cylinder carts, box, or crates are not required, only suggested. Putting cylinders inside covered boxes or crates and not securing them, even if you put a lid on the box or crate, will not be considered secured by DOT.
- Tie downs must have an aggregate working load limit equal to at least ½ times the weight of the load.

- Cryogenic and aluminum cylinders must be protected against a metal binding device or chain, which can damage the cylinders. It is recommended that these cylinders be nested inside a grouping of high-pressure cylinders, to avoid possible cylinder wall damage, and the binding be placed around these outer cylinders. Otherwise, a strap binding is recommended.
- Cylinders should be positioned or secured against lift gate railing in a manner to prevent them from falling during loading or unloading. Do not overload the manufacturer's weight limit for the lift gate. Do not ride the lift gate with cylinders. The lift gate operator should stand to one side and be prepared to move if the lift gate malfunctions or a cylinder falls over.

ON THE DOCK

- Cylinders should be stored in approved areas, marked to indicate the gas or type of gas (flammable, poison, corrosive, etc.)
- Storage areas should be well ventilated, dry and protected from temperature extremes.
- Access to storage areas should be limited to trained and authorized personnel only. Policy should dictate the only exception to this rule, if any, is when an authorized person escorts someone.
- Everyone entering your storage areas should understand how they are to respond in case of an emergency. This should be spelled out in your Emergency Action Plan.
- Someone in the organization should be assigned to monitor the area periodically to ensure cylinders are not allowed to accumulate on the edge of the dock or in aisle ways.
- Cylinders must be secured to prevent falling. You may chain, block or brace cylinders or, in most instances, you can "NEST" cylinders to minimize the chance of falling. "Nesting" is a practice recognized by OSHA, National Fire Protection Association (NFPA) and the Compressed Gas Association (CGA). However, it is a technique that must be learned through practice. Supervision is required to ensure it is used consistently.

Proper nesting requires at least 3 points on every cylinder touch another cylinder or stationary object, such as a wall. The following diagrams illustrates proper and improper cylinder nesting methods. Additional information on cylinder storage, physical restraints, and nesting can be found in the GAWDA OSHA Manual, Section 30.

QUIZ ON CYLINDER STORAGE / SECUREMENT

1. Small cylinders may be put loosely into a box provide the box is secured to the vehicle.
 - A. True
 - B. False
2. You have loaded 40 cylinders with an approximate weight of 165 pounds each, which totals 6,600 pounds. If a tie down has a working load limit of 5000 pounds, how many tied owns must you use?
 - A. One
 - B. Two
 - C. Three
3. OSHA prohibits cylinders being allowed to accumulate in aisle ways, near doorways, stairs, ladders etc.
 - A. True
 - B. False
4. If you have only three cylinders of a particular gas, they can be nested in a triangle fashion.
 - A. True
 - B. False

5. No damage can result to a cryogenic cylinder or aluminum cylinder provided the metal ratchet doesn't touch the cylinder wall.

A. True

B. False

ANSWERS

1. False. Cylinders must be secured relative to the vehicle and relative to one another. Cylinders must not be allowed to rattle around inside a box, loosely.

2. One. Securement devices must have a working strength equal to at least $\frac{1}{2}$ the weight of the load. If your total load is about 6600 pounds, and the working strength of your tie downs is 5000 pounds, you are required to use only one tie down.

3. True

4. False. Nesting requires at least three points of every cylinder to touch another cylinder or stationary object -- this cannot be accomplished with only three cylinders. Consider using other cylinders of similar hazard properties or inert gases to provide enough cylinders to nest.

5. False. Even if the metal part of the ratchet doesn't touch the cylinder, excessive tightening of the webbing can crush a cylinder wall.