

# DLA-SM COMPRESSED GAS CYLINDER SAFETY PROGRAM

Sep 2022

## PURPOSE

Special storage, use, and handling precautions are necessary to control the hazards associated with compressed gas cylinders. The purpose of the DLA-SM (Strategic Materials) Compressed Gas Cylinder Safety Program is to prevent occupational injuries related to the storage and use of compressed gas cylinders. DLA-SM will accomplish this through training in the handling, storage, use, inspection, and movement of compressed gas cylinders. Only properly trained employees will be permitted to perform operations involving compressed gas cylinders. Training will be conducted based on the contents of this program.

## RESPONSIBILITY

The following personnel have key roles and responsibilities in carrying out the DLA-SM Compressed Gas Cylinder Safety Program:

- The Environmental Division Chief is responsible for the overall operation and administration of the program.
- Depot Managers are responsible for the implementation, evaluation, continuing maintenance, and effectiveness of the program at their respective Depots.
- ESOH (Environmental, Safety, & Occupational Health) staff will be responsible for monitoring compliance for and conducting training on this program.
- Employees shall be responsible for completing training, as necessary, knowing the provisions of the Compressed Gas Cylinder Safety Program, complying with the procedures outlined in this program, and reporting to the Depot Manager any problems, accidents, defective equipment, unsafe conditions, or lack of proper storage space for compressed gas cylinders used by them.

## LIST OF COMPRESSED GASES & EQUIPMENT

Compressed gases used within the DLA-SM Depots are Inert gases, such as Argon, and Carbon Dioxide (liquified). These products are used in purging process operations for some of our commodities. Each gas cylinder is fitted with a regulator upon its installation at the purging process station.

## PERSONAL PROTECTIVE EQUIPMENT (PPE)

Steel/Composite-toed work shoes are required when maneuvering compressed gas cylinders.

## INSPECTION PROCEDURES

Compressed gas cylinders should be visually inspected upon receipt for correct labels and markings, and to ensure they are fit for use including:

- Visual inspection will include the cylinder container, safety relief device, valve and stem, and valve protection cap - checking for any leaks, cracks, etc.
- A stamped hydrostatic test date on the cylinder should be within the last five years.
- Cylinders must be legibly marked by a stencil or stamp - labeled with at least the name of the chemical/contents (or commonly accepted name of the material contained, i.e., Argon).
- Cylinder valve protection cap must be in good condition and attached to the cylinder when it is not in use.

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- The cylinder mounting and restraining devices, such as a chain or strap, must not show any signs of damage or loss of integrity.
- Straps/chains must surround the cylinder approximately 1/3 to 1/2 of the height of the cylinder measured from the top of the cylinder to the floor.
- Do not accept a cylinder from the gas vendor without a proper label or without a secured valve protection cap.
- If a cylinder is found to be unfit for use or you notice a problem with a cylinder, it must be taken out of service and returned to the manufacturer for repair or disposal. Do not attempt to repair a defective cylinder.
- When inspecting a cylinder and associated equipment after use, ensure valves are closed and tightened; any remaining residual gas has been safely released from the line; and valve protection cap is securely fastened during long-term storage.
- Ensure the rack maintaining empty cylinders is labeled EMPTY.

### HANDLING PROCEDURES

The gas vendor will install the cylinder at the purging process station rack. Ensure the cylinder is stored upright and strapped/chained with valve protection cap in place prior to removing it to hook up the regulator.

Attach the proper sign/tag to the cylinder(s): FULL for any cylinder strapped to the purging process manifold with the valve protection cap still attached, but not in use. IN USE for those cylinders attached to the purging process manifold. And EMPTY to those that are empty, strapped/chained to the empty rack, and that have the protective cap attached.

Engineering controls must be implemented when using, transporting, moving, and storing compressed gas cylinders:

- Ensure cylinders are secured in an upright position with the strap tightened or chain attached.
- Ensure adequate ventilation (typically six air changes per hour or more) in areas where the cylinders are used and stored.
- Always keep removable caps and valve outlet caps/plugs on cylinders except when connecting the valve to the dispensing equipment regulator.
- Carefully inspect the cylinder valve for damage and foreign materials before connecting the regulator to the cylinder. Connect the regulator to the cylinder valve fitting and tighten snugly.
- Open cylinder valve slowly and directed away from your face.
- Leak test all connections using a soapy solution. Leaks can occur at the regulator, cylinder stem, and at the hose connection.
- Never use a cylinder without a regulator.
- If a cylinder valve cannot be opened, the valve should never be forced. If a valve cannot be opened by hand, the cylinder should be returned, and another cylinder obtained. Employees must not attempt to repair cylinders or cylinder valves or to force stuck or frozen cylinder valves.
- When cylinder is empty, close valve, remove regulator assembly, install, and tighten the valve protection cap over the valve assembly, and carefully move cylinder to the empty rack. Empty cylinders must be marked empty or have a tag with the label of EMPTY, must have the valve protection cap installed, and cylinder must be secured by chain or strap. Do not attempt to lift

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or move cylinder by the valve protection cap.

- Contact the gas vendor to schedule pickup of empty cylinders and delivery of full cylinders.
- Only properly trained employees should handle and/or use compressed gas cylinders.
- Employees must wear proper PPE during all operation requiring the handling or use of compressed gas cylinders. Please see Purging Process PHA/JHA for PPE requirements.

#### STORAGE PROCEDURE

- Store full and empty cylinders apart.
- Compressed gas cylinders are to be stored upright and in dry, well-ventilated areas away from exits and out of extreme hot or cold environments.
- Empty compressed gas cylinders are transferred to the EMPTY cylinder rack near the purging process station to await removal by the gas vendor.
- Straps or chains must surround the cylinder approximately 1/3 to 1/2 of the height of the cylinder measured from the floor to prevent falling/tipping.
- Full cylinders are installed and strapped/chained to the regulator manifold rack by the gas vendor. The gas vendor will also remove the empty cylinders from the EMPTY rack.
- Attach the proper sign/tag to the cylinders: FULL for any cylinder strapped to the purging process manifold with the valve protection cap still attached, but not in use. IN USE for those cylinders attached to the purging process manifold. And EMPTY to those that are empty and that have the protective cap attached.
- Keep the valve protection cap attached while cylinder remains in storage, cylinder is not in use, and when the regulator has been removed from the cylinder.

#### GAS SPECIFIC SAFETY PROCEDURE

There are no specific safety procedures for the inert compressed gases of argon and liquid carbon dioxide per 29 CFR 1910.102-111 used at the DLA-SM Depot facilities.

Any gas that has the potential to displace oxygen in sufficient quantities can cause asphyxiation. Inert gases, such as Argon, must be treated with caution. If left to leak into a closed space, these gases may displace oxygen and create a risk of asphyxiation. The following special precautions shall be taken for asphyxiant gases:

- Do not store asphyxiant gases in areas without ventilation.
- In the event of a leak, shut off the source of the gas leak if there is no risk to personnel and ventilate the area.
- An oxygen detection device must be present when the calculated oxygen concentration is less than 18% if the full contents of the cylinder were released.
- If a person has symptoms of asphyxiation, move the victim to fresh air and obtain proper medical attention.

#### EMERGENCY PROCEDURE

In case of a gas emergency, immediately leave the area and notify the Depot Manager. Follow the DLA-SM Depot Emergency Response Plan.

#### TRAINING

Employees who use and handle compressed gas cylinders will be trained in the safe use, inspection,

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handling, storage, and movement of compressed gas cylinders. Refresher training will be provided annually. Minimum training to be provided will include the following:

- Receipt and inspection of cylinders
- Labeling
- General precautions
- Safe handling of containers
- Valve protection caps, regulators, and leak testing
- Storage requirements
- Special precautions for storing and handling of asphyxiant gases
- Emergency procedures

### RECORDKEEPING

The DLA-SM credit card clerks at both Hammond and Scotia Depots maintain an inventory record and receipts of all purchased compressed gas cylinders. Records are maintained at the perspective Depot location for 3 years.

### PLAN/PROGRAM REVIEW

The DLA-SM Compressed Gas Cylinder Safety Program document will be reviewed annually and edited appropriately due to changes in the revisions of procedures, regulations, or standards.

### REFERENCES

- Occupational Safety & Health Administration (OSHA) 29 CFR 1910.101: Compressed Gases
- Compressed Gas Association (CGA) Pamphlets C-6-1968 (Updated 19 AUG 2019) and C-8-1962
- DLA-SM Depot Emergency Response Plan
- DLA-SM HAZCOM Plan
- National Fire Protection Code 55
- CGA Pamphlets:
  - S-1.1-11 Pressure relief device standards-part 1 – Cylinders for Compressed Gases (Updated 23 FEB 2022)
  - S-1.2-09 Pressure relief device standards-part 2 – Portable Containers for Compressed Gases (Updated 28 JUN 2019)
  - G-11.1-08 Commodity Specification for Argon (Updated 27 OCT 2016)
  - G-6.2-2011 Commodity Specification for Carbon Dioxide (Updated 14 OCT 2011)

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