



COMPRESSED GAS ASSOCIATION, INC.

# SAFETY BULLETIN

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## GUIDELINES FOR COMMON CARRIER VEHICLE SHIPMENTS OF COMPRESSED GAS CYLINDERS

### Introduction

The Compressed Gas Association believes that there is a need to provide recommendations and guidelines for the safe loading and unloading of cylinders in transportation.

### Scope

This publication provides guidelines for those common carriers handling compressed gas cylinders and includes recommendations for temporary storage and handling at their terminals. For additional information, refer to CGA P-1, *Safe Handling of Compressed Gases in Containers* [1].

### Hazard recognition

Each cylinder of compressed gas is required, under applicable transportation regulations, to be legibly marked with a proper shipping name, identification number, and labeled with a color-coded diamond with each side measuring a minimum of 30 mm (1.25 in) in accordance with CGA C-7, *Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers* (see 49 CFR 172.400a and 49 CFR 172.407c for more information) [2, 3]. Additional information may appear in the form of marking or subsidiary labeling [3].

NOTE—In Canada, a diamond with sides that are reduced to not less than 30 mm (1.2 in) in length may be displayed if a 100-mm diamond cannot be displayed due to the size of the cylinder. See Transport Canada's *Transportation of Dangerous Goods Regulations*, 4.7(2) and 4.10(4), for more information [4].

### Gas classification

Gases in Hazard Class 2 are subdivided into three divisions: 2.1 Flammable gas; 2.2 Non-flammable gas; and 2.3 Toxic (Poison) gas. Common carriers transporting hazardous material/dangerous goods are required to ensure their drivers and shipping personnel are trained in the appropriate transportation regulations.

Gases can have more than one hazard classification associated with them. Subsidiary labels indicate one or more of the following hazards: flammable; corrosive; or oxidizer.

### General safety rules

At a minimum, it is recommended that steel-toed shoes, gloves, and safety glasses be worn when handling compressed gas containers.

Smoking, matches, and open flames are prohibited within 25 ft (7.6 m) of flammables, oxidizers, or explosives. See 49 CFR 397.13 for more information [3].

Valve protection devices such as cylinder caps are required on flammables, toxics, and corrosives. CGA recommends that valve protection devices be affixed on all cylinders designed to accept a cylinder cap.

Containers suspected of leaking shall not be accepted for transport. For cryogenic containers (CTC/DOT 4L or TC 4LM), venting is a normal occurrence and is not considered a leak. When venting occurs, a low temperature hazard exists for the venting gas and, except for oxygen, an asphyxiation hazard exists for the air displaced during venting. It is recommended that drivers open the doors of an enclosed vehicle used to

transport compressed gases and allow the cargo space to ventilate prior to entering. For more information, see CGA SB-2, *Oxygen-Deficient Atmospheres*, and CGA SB-1, *Hazards of Refilling or Reusing Compressed Refrigerant (Halogenated Hydrocarbon) Gas Cylinders* [5, 6].

### **Orientation of cylinders**

Cryogenic containers (CTC/DOT 4L or TC 4LM) shall be secured in an upright position.

Liquefied petroleum gas (LPG) shall be shipped in an upright position in accordance with 49 CFR 177.840(a) (1) [3]. It is recommended that acetylene cylinders be shipped in an upright position.

### **Securing cylinders**

Cylinders shall be properly blocked, braced, and secured.

To prevent container damage, chains shall not be used on CTC/DOT 4L or TC 4LM containers.

Cylinders that are palletized should be treated as one unit. Pallets should not be broken apart.

### **Segregation of containers**

The Segregation Table for Hazardous Materials found in 49 CFR 177.848 indicates that in the United States, Class 2.3 (Toxic/Poison gases) in Zone A may not be carried with flammables, corrosives, oxidizers, explosives, and self-reactive materials. In addition, gases classified as 2.3 (Toxic/Poison gases) in Zone B cannot be carried with explosives. If carried with flammables or oxidizers, 2.3 (Toxic/Poison gases) in Zone B shall be separated so, in the event of leakage from the packages under conditions normally incident to transportation, commingling of hazardous materials would not occur [3].

### **Container markings**

Markings on containers can supply additional information regarding orientation, toxicity, whether the material is a hazardous substance and meets or exceeds its reportable quantity (RQ), or is shipped under an exemption. To prevent obscuring of the container markings, a compressed gas cylinder shall not be placed into an over-pack without the approval of the shipper.

See the Hazard recognition and Gas classification sections for labeling requirements.

### **Placarding**

Shippers shall offer the appropriate placards for the materials offered for transportation. It is the carrier's responsibility to affix and maintain the proper placards as additional freight is picked up throughout the day.

### **Emergency response/reporting of incidents**

Appropriate emergency response information shall accompany the shipment of hazardous materials. An *Emergency Response Guidebook*, material safety data sheet (MSDS), or product information on the shipping paper fulfills this requirement [7].

All unintentional releases of product while in transportation require reporting to the appropriate regulatory authority by the carrier.

Suspected leaks or incidents shall be reported immediately to the shipper for assistance in determination of proper mitigation techniques.

### **Shipping terminals/interim storage**

CGA recommends the use of cylinder carts to move individual cylinders.

Never move a liquid container by the "halo ring" or by the sight glass. Liquid containers shall not be rolled. A hand truck shall be used to move liquid containers.