



OCTOBER 2022

ENCLOSED

Safety Topics

Carbon Dioxide Exposure and Asphyxiation

Please contact Marilyn Dempsey, GAWDA DHS, EPA, & OSHA Consultant for more information.

Traffic Bulletin

Identification Numbers

Please contact Mike Dodd, GAWDA DOT Consultant for more information.

Medical, Food/Beverage and Specialty Gases Bulletin

1. FAQs
2. GAWDA Professional Compliance Training (10/18-20/2022); October Medical Gas Roundtable (10/28/2022) – Subparts H & I – Holding and Distribution, Laboratory Controls
3. Micro-Audit Suggestions

Please contact Tom Badstubner, GAWDA FDA Food, Medical & Specialty Gases Consultant for more information.

**** Join us for our Monthly LIVE “Safety Managers’ Safety Meeting” ****

Our next meeting is **November 9th** @ 1PM Eastern.

Visit us at www.gawda.org/safety-meeting/ to learn more and sign up today.

GAWDA is pleased to distribute this information to Distributor and Supplier Key Contacts and all Compliance Manual Owners. Please carefully review this mailing and be sure the information is passed to the appropriate person within your organization. Timely Safety data is a benefit of Membership in GAWDA.



Safety Meetings are important!

They: get your employees actively involved
encourage safety awareness
help identify problems before they become accidents
motivate employees to follow proper safety procedures

We are happy to provide you with a monthly topic for your agenda.

ROUTE TO:

- ☐ General Manager
- ☐ Safety Coordinator
- ☐ Supervisor Dept. _____
- ☐ Other _____
- ☐ Date of Meeting _____

October 2022

Carbon Dioxide Exposure and Asphyxiation

The release of any gas into a confined or limited ventilation area can lead to asphyxiation. Carbon dioxide (CO₂) is a common product used in restaurants, welding, laboratories, grow houses and cannabis extraction facilities.

CO₂ is colorless, odorless, non-flammable gas that is 1.5x heavier than air at normal atmospheric temperatures. CO₂ can accumulate in low lying areas and confined spaces. Because of these properties it is considered to have NO Warning Properties!

ROUTES OF CARBON DIOXIDE EXPOSURE

Inhalation

Low concentrations are not harmful. Moderate concentrations will affect cognitive abilities. Higher concentrations can affect respiratory function and cause excitation followed by depression of the central nervous system and death. Extremely high concentration will also displace oxygen in the air, causing an oxygen-depleted atmosphere after death has occurred from the toxicity. Symptoms occur more quickly with physical effort.

Skin Contact

Direct contact with the liquefied gas or solid can chill or freeze the skin (e.g., frostbite).

Eye Contact

Gas may cause mild irritation. Direct contact with the liquefied gas can freeze the eye. Permanent eye damage or blindness can result.

Ingestion; Injection; Skin & Ocular Absorption

Not relevant routes of exposure.

Note. Adapted from "Carbon Dioxide," OSH Answers Fact Sheets, by CCOHS, 2017.



Concentration	Effects
5,000 ppm (0.5%)	OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV) for 8-hour exposure
10,000 ppm (1.0%)	Typically, no effects, possible drowsiness
15,000 ppm (1.5%)	Mild respiratory stimulation for some people
30,000 ppm (3.0%)	Moderate respiratory stimulation, increased heart rate and blood pressure, ACGIH TLV-Short Term
40,000 ppm (4.0%)	Immediately Dangerous to Life or Health (IDLH)
50,000 ppm (5.0%)	Strong respiratory stimulation, dizziness, confusion, headache, shortness of breath
80,000 ppm (8.0%)	Dimmed sight, sweating, tremor, unconsciousness, and possible death

Some real-life examples of CO₂ concentrations:

- **Carbon dioxide CO₂ levels outdoors** near ground level are typically 300 ppm to 400 ppm or 0.03% to 0.040% in concentration.
- **Carbon dioxide CO₂ levels indoors in occupied buildings** are typically around 600 ppm to 800 ppm or 0.06% to 0.08% in concentration. You'll find this data in many indoor air quality articles and books and it's consistent with what we find typically in our own field measurements.
- **Carbon dioxide CO₂ levels indoors in an inadequately vented space with heavy occupation** is often measured around 1000 ppm or 0.10% in concentration. (5)

Safety precautions to protect against carbon dioxide asphyxiation?

- Employees should receive training and be knowledgeable of the potential sources and symptoms of exposure to CO₂.
- Dry ice and liquid CO₂ can cause tissue damage, proper PPE should be worn when handling dry ice or filling CO₂.
- If you are working near any sources of dry ice or CO₂ filling and develop any of the symptoms of exposure, move to an area of fresh air immediately, and report the incident to your supervisor. (Fresh air or oxygen is the primary remedy for CO₂ exposure.)



- If you are pregnant consult with your supervisor and your physician about limiting exposure to CO₂.
- Do not stand directly next to open bins that contain dry ice or in vapors from these bins. Do not touch dry ice or a bin containing dry ice.
- Additional caution should be taken when filling or emptying dry ice bins as high concentrations of CO₂ will be trapped in the bottom of the bin.
- CO₂ cylinders should be vented in a secured position, in an open area (preferably outdoors).
- Employees should never place themselves directly in front of a venting CO₂ valve (for asphyxiation and pressure hazards are present in the gas stream).

Drivers have additional exposure to the hazards of CO₂ and a customer site survey may be necessary to facilitate a safe delivery. Customer site hazards may include:

- Basement deliveries. This may be considered a confined space and again a customer site survey may be necessary to develop a safe delivery plan. Also consider reviewing the GAWDA safe practice for stair delivery (2012-02_ CYLINDER DELIVERY AT LOCATIONS WITH STAIRS AND OR RAMPS, rev.2018).
- Any area that may be deemed a confined space should be equipped with a CO₂ detector and alarm system.
- An interior installation of a CO₂ system should have all venting, relief devices and discharge vents should be piped outdoors.
- Fill connections should be situated on the exterior of the building.
- Signage should be installed on entry doors to the storage area.



Resources:

1. OSHA.gov

2. Staub, Fred D. "Toxic Carbon Dioxide Exposures, the Unacceptable Risk." Professional Safety Journal, July 2021, p.24-36.

3. Compressed Gas Association, Inc. (CGA) pamphlets should be consulted. These pamphlets are designed to assist personnel involved in transferring liquid carbon dioxide, designers, engineers, safety and training personnel, distributors, restaurant personnel, other users, inspectors, and all interested parties.

CGA G-6.5-1992, Standard for Small Stationary Low Pressure, Carbon Dioxide Supply Systems
CGA G-6.4-1992, Safe Transfer of Low Pressure Liquefied Carbon Dioxide in Cargo Tanks, Tank Cars, and Portable Containers

CGA G-6.3-1995, Carbon Dioxide Cylinder Filling and Handling Procedures

CGA G-6-1984, Carbon Dioxide

CGA G-6.2-1994, Commodity Specification for Carbon Dioxide

CGA G-6.6-1993, Standard for Elastomer-Type Carbon Dioxide Bulk Transfer Hose

4. GAWDA.org

5. Daniel Friedman "Typical Levels of Carbon Dioxide Gas CO₂ Normal Levels in Air Indoors & Outside." https://inspectapedia.com/hazmat/CO2_Typical_Levels.php. December 31, 2021. InspectApedia.com.

6. Dodd, Michael, "Carbon Dioxide Asphyxiation." GAWDA Safety Topic, August 2017.

If you have any questions, please feel free to contact me.

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Traffic Bulletin

October 2022

Identification Numbers

Also known as the UN or NA numbers that you see on shipping papers, cylinder decal markings, the orange panels on cargo tanks, and inside some placards. I wish I could stop and leave it as simple as that but like most DOT regulations, it can get more complicated.

As an integral part of hazard communication, identification numbers are a required part of shipping paper descriptions, as well as package markings.

Where do you find the proper Identification Numbers?

You find the UN and NA identification numbers assigned to each proper shipping name in column 4 of the hazardous materials table in 172.101. Those preceded by the letters "UN" are appropriate for both international and domestic transportation. Those preceded by the letters "NA" are for domestic transportation and not for international transportation – except to and from Canada.

The NA9000 series of identification numbers are for use with proper shipping names that are not appropriately covered by the international regulations or addressed by the international standards for emergency response information purposes

How do you properly show the Identification Numbers?

It depends on the type of package you are shipping. In our business, this is typically cylinders or cargo tanks, but it can include trailers loaded with large quantities of certain products.

Non-bulk Packaging (cylinders are an example)

For non-bulk packages, identification numbers must be marked in association with the proper shipping name. For cylinders, this is done by placing the identification number with the proper shipping name inside the left panel of the cylinder decal as shown in the CGA pamphlet C-7. Identification numbers are not required on packages which contain only limited quantities or ORM-D materials. §172.301

Although the regulations do not specifically state where on a packaging the marking shall be placed, they do require such marking to be:

- Durable, in English and printed on or affixed to the surface of a package or on a label, tag, or sign;
- Must be displayed on a background of sharply contrasting color;
- Must be unobscured by labels or attachments; and
- Must be located away from any other marking (such as advertising) that could substantially reduce its effectiveness." §172.304



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Large Quantities of Non-Bulk Packaging (§172.301)(§172.313)

(Examples of this are an acetylene manifold cylinder trailer, or a trailer with just one product loaded and the cylinders and product weigh 8,820 pounds or more, or a lot (2,205 pounds or more) of hazard zone A or B poisonous gas. I told you this can get complicated.) Here are the specifics:

A transport vehicle or freight container containing only a single hazardous material in non-bulk packages must be marked, on each side and each end with the material's identification number, subject to the following:

- Each package must be marked with the same proper shipping name and identification number;
- The aggregate gross weight of the hazardous material is 4,000 kg (8,820 lb) or more;
- All of the hazardous material is loaded at one loading facility; and
- The transport vehicle or freight container contains no other material, hazardous or non-hazardous.

This does not apply to Class 1 materials, Class 7 materials, or non-bulk packagings for which identification numbers are not required (such as limited quantities or ORM-D).

A transport vehicle or freight container loaded at one loading facility with 1,000 kg (2,205 lb) or more of non-bulk packages containing material that is poisonous by inhalation (in Hazard Zone A or B), having the same proper shipping name and identification number, must be marked on each side and each end with the identification number for the material. If the transport vehicle or freight container contains more than one inhalation hazard material that meets this requirement, it must be marked with the identification number for only one material. That one identification number is determined by the following:

- For different materials in the same hazard zone, the identification number of the material having the greatest aggregate gross weight.
- For different materials in both Hazard Zone A or B, the identification number for the Hazard Zone A material.
- The four-digit identification number may be displayed on an orange panel, placard, or white square-on-point. These methods are described in the next section.



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Bulk Packaging

Hazardous materials identification numbers must be displayed on bulk packagings such as portable tanks, cargo tanks, and tank cars. The four-digit identification numbers may be displayed in one of several ways:

- **(Orange Panel)** on an orange panel measuring 160 mm (6.3 inches) by 400 mm (15.7 inches) with a 15 mm (0.6 inches) black border. The numerals are to be in 100 mm (3.9 inches) black Helvetica Medium on an orange background. §172.332



- **(Placard)** across the center of the primary hazard placard in 88 mm (3.5 inches) black Alpine Gothic or Alternate Gothic No. 3 numerals on a white background 100 mm (3.9 inches) high and approximately 215 mm (8.5 inches) wide and is outlined with a solid or dotted line border. (§172.332) The display of a four-digit identification number is allowed on most placards. However, identification numbers must not be displayed on Class 1, Class 7, DANGEROUS or subsidiary placards.



- **(White Square-on-Point)** for hazardous materials in hazard classes that do not require placards, the identification number must be displayed on either an orange panel or on a plain white square-on-point configuration with the same outside dimensions as a placard. §172.336



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Identification numbers must be displayed on each side and each end of a bulk packaging that has a capacity of 3,785 L (1,000 gal.) or more. Bulk packaging with lesser capacities only need the identification numbers displayed on two opposing sides. §172.302

Special Provisions (there are always the extra rules to consider)

When the identification number is to be displayed on a COMBUSTIBLE placard, the entire background below the white background for the ID number must be white during transportation by rail and may be white during transportation by highway; thus, mandatory by rail, permissible by highway. §172.332

If hazardous materials having different identification numbers are transported in portable tanks, tank cars, or cargo tanks having more than one compartment, then identification numbers are not required on the ends of the tanks. The identification numbers on the sides of such tanks must be displayed in the same sequence as the compartments containing the materials they identify. §172.336

Bottom-line Summary

Most of you have identification numbers addressed when you use the proper numbers on your cylinder decals and shipping papers.

If you have cargo tanks, remember to properly mark them with either the orange panels or the placards with the white and black inserted panel.

If you have acetylene bulk trailers, or you have vehicles with 8820 pounds or more of just one product, or you are transporting 2205 pounds or more of hazard zone A or B poison, remember to place either the orange panels or placards with the white and black panel on them.

If there are any questions regarding this Bulletin, please ask.

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Medical, Food/Beverage and Specialty Gases Bulletin

10/01/2022

Frequently Asked Questions

Q – Do I really need to complete my CARES Act submission?

A – Yes. However, the FDA has said again this month that the deadlines are not mandatory. Our recommendation is to submit 2020 and 2021 as soon as practical. The 2022 CARES submission will be due 2/15/2023. Contact Jodie (jodie@asteriskllc.com) for templates or other information about CARES reporting.

Q - Can I fill medical gas cylinders with my customers' labels?

A - You can fill cylinders with your customers' labels. You just need to have a copy of their label (approved by your QCU) in your Label Master Record so your pumpers know that the label is approved. If the label is not also "FDA Listed" by your customer, it should be listed by you with the FDA. If you fill cylinders with their labels, the label must have a qualifier before the company name on the label.

FDA Requirements:

1. Labels shall bear the actual corporate name or the name under which business is conducted; this name may be preceded or followed by the name of the division or parent company.
2. If a company is distributing medical gas cylinders that were filled by a third party, and the name of the company is on the label, the company name must be identified with an appropriate qualifying statement, such as:
Manufactured for _____
Manufactured by _____ for _____
Manufactured for _____ by _____
Distributed by _____
3. A company name appearing on the label without qualification simply means that the company is the manufacturer. Otherwise, the product shall be misbranded.
4. The street address, city, state, and zip code of the manufacturer shall be on the label unless it is shown in the current city or telephone directory.
5. The principal place of business address may be used for product manufactured at a branch.

There cannot be two product labels on the cylinder.



Medical, Food/Beverage and Specialty Gases Bulletin

GAWDA Professional Compliance Training

This year, the Fall Professional Compliance Training will be held via teleconference and in-person (seats are limited)

October 18 to 20, 2022

[Click here to register or for more information.](#)

October Medical Gas Roundtable (10/28/2022) – Subparts H & I – Holding and Distribution, Laboratory Controls

These GAWDA Medical Gas roundtables are excellent sources of CGMP training and the latest industry compliance news. In October we will be discussing warehousing and laboratory operations.

For your information, we are also conducting the following additional webinars in October:

- **Specialty Gas Operations** - Measuring and Controlling Uncertainty in Gas Chromatographs (ISO 6143)
- **Food Gas Roundtable** – Part 117 Subpart C Food Safety Plan

These and other webinars are available as a streaming recording at a time convenient to you. If you are unable to view the webinar live, just let us know and we will send you the link to the recording. If you would like to receive invitations to the training webinars, just send an email to jodie@asteriskllc.com.

Micro-audit

This section of the Medical Gas Bulletin lists small steps you can take each month to improve your medical gas management system. These steps are not designed to be a full audit, but rather small steps to sample your compliance.

For this month, simply do these items:

1. **Filling Procedures** – Copy the fill procedure from the SOPs and watch a cylinder filling operator actually perform the procedure. This is the same technique the FDA uses to see if we are following our fill procedures.
2. **Documented Training** – Complete a training record for the cylinder filling operator that was observed. Attach a copy of the completed SOP to the training record.

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