

**CRAFT
BREWERS
CONFERENCE**
& BrewExpo America®



#CraftBrewersCon

The Invisible Ingredient

Safety Considerations for Compressed Gases
in Craft Brewing Facilities



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Safe Handling & Use of Cylinders & Containers



Carbon Dioxide Hazards



Additional Gas Hazards



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Resources for Craft Brewers





Safe Handling & Use of Cylinders & Containers

#1

Cylinder and container handling incidents are the most frequently reported cause for gas-related lost time injuries at brewing facilities.

SAFE USE OF REFRIGERATED & CRYOGENIC LIQUIDS

WEAR ALL APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE)



SAFETY GLASSES OR SAFETY GOGGLES

CLOTHING AND SHOES THAT COVER THE SKIN AND DO NOT HAVE CREASES OR FOLDS THAT COULD TRAP SPILLED COLD LIQUID

READ AND UNDERSTAND THE SPECIFIC HAZARDS OF THE GAS PRODUCT IN USE

IN ADDITION TO THE HAZARDS PRESENTED BY THE EXTREMELY COLD TEMPERATURE OF REFRIGERATED AND CRYOGENIC LIQUIDS, THE GAS PRODUCT HAS UNIQUE PROPERTIES AND HAZARDS.

READ THE SAFETY DATA SHEET PROVIDED BY THE GAS SUPPLIER FOR THE PRODUCT IN USE AND FOLLOW ALL REQUIREMENTS.

NEVER CONSUME OR DIRECTLY TOUCH REFRIGERATED OR CRYOGENIC LIQUIDS



ONLY USE CONTAINERS & EQUIPMENT DESIGNED FOR REFRIGERATED OR CRYOGENIC LIQUIDS



NEVER PLACE REFRIGERATED OR CRYOGENIC LIQUIDS IN SEALED, NON-VENTED CONTAINERS



FOLLOW LOCAL REQUIREMENTS FOR VENTILATION & MONITORING



CGA
Compressed Gas Association
The Standard for Safety Since 1913



SCAN HERE FOR MORE INFORMATION OR VISIT

WWW.CGANET.COM

REFERENCES

SAFE USE OF COMPRESSED GAS CYLINDERS & CONTAINERS

USE EQUIPMENT DESIGNED FOR MOVING CYLINDERS AND CONTAINERS



DO NOT DRAG, DROP OR ROLL CYLINDERS OR CONTAINERS. NEVER LIFT CONTAINERS BY THE VALVE PROTECTION. AN IMPROPERLY HANDLED CYLINDER OR CONTAINER CAN ROLL OR FALL, LEADING TO INJURY, EQUIPMENT DAMAGE, OR UNCONTROLLED PRODUCT RELEASE.

WHEN MOVING CYLINDERS OR CONTAINERS, MAKE SURE VALVES ARE CLOSED. VALVE PROTECTION IS IN PLACE, AND THE CYLINDER OR CONTAINER IS PROPERLY SECURED AND MOVED IN THE UPRIGHT, VALVE-UP POSITION.

SECURE CYLINDERS AND CONTAINERS WHEN BEING USED OR STORED



AN UNSECURED CYLINDER OR CONTAINER CAN ROLL OR FALL, LEADING TO INJURY, EQUIPMENT DAMAGE, OR UNCONTROLLED PRODUCT RELEASE.

SECURE CYLINDERS AND CONTAINERS WITH A CHAIN, STRAP, CORD, OR OTHER SUITABLE DEVICE. DO NOT USE EXTENSION CORDS, CLOTHING BELTS, ETC.

USE NON-ABRASIVE STRAPPING TO SECURE COMPOSITE CYLINDERS.

STORE AND USE WITH THE VALVE UP TO ENSURE PROPER OPERATION OF VALVE AND RELIEF DEVICES.

USE VALVE PROTECTION FOR CYLINDERS NOT IN USE.

USE THE CORRECT VALVE OUTLET CONNECTION



USE OF ADAPTORS OR INCORRECT VALVE OUTLET CONNECTIONS CAN RESULT IN A DANGEROUS CONNECTION LEADING TO INJURY, EQUIPMENT DAMAGE, OR UNCONTROLLED PRODUCT RELEASE. NEVER FORCE CONNECTIONS THAT DO NOT FIT.

CONTACT YOUR GAS SUPPLIER FOR THE CORRECT VALVE OUTLET CONNECTION.

CONNECT ALL EQUIPMENT BEFORE OPENING VALVE



THE SUDDEN RELEASE OF PRODUCT CAN CAUSE SERIOUS INJURY OR DAMAGE TO EQUIPMENT.

CONNECT ALL EQUIPMENT, POINT THE VALVE OUTLET AWAY FROM PERSONNEL, AND OPEN THE VALVE SLOWLY.

ONLY TIGHTEN OR REPAIR CONNECTIONS WHEN THE SYSTEM IS NOT UNDER PRESSURE.

CHECK FOR LEAKS.

TRANSFILLING SHALL ONLY BE PERFORMED BY THE SUPPLIER OR TRAINED PERSONNEL



TRANSFILLING CYLINDERS OR CONTAINERS CAN RESULT IN OVERPRESSURIZATION, LEADING TO A CATASTROPHIC FAILURE HAZARD.

TRANSFILLING CAN ALSO INTRODUCE CONTAMINANTS INTO THE SYSTEM.

TRAINED PERSONNEL SHALL FOLLOW WRITTEN OPERATING PROCEDURES, USE APPROPRIATE EQUIPMENT, AND COMPLY WITH REGULATIONS WHEN TRANSFILLING.

IMMEDIATELY NOTIFY YOUR GAS SUPPLIER OF ANY EQUIPMENT ISSUES, DAMAGE, OR LEAKS



DAMAGED OR LEAKING CYLINDERS OR CONTAINERS ARE A SAFETY HAZARD. NEVER ATTEMPT TO REPAIR A CYLINDER, CONTAINER, OR VALVE.

NEVER TRANSPORT OR SHIP A DAMAGED OR LEAKING CYLINDER OR CONTAINER.

CGA
Compressed Gas Association
The Standard for Safety Since 1913



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WWW.CGANET.COM

REFERENCES

CONSULT YOUR GAS SUPPLIER FOR ADDITIONAL INFORMATION



GAS SUPPLIER

5 Basic User Responsibilities

1

Read and understand the safety data sheet (SDS) and the label; make sure the label remains legible with no alterations.

2

Understand the risks to safe use of the cylinder or container and assess the area where it will be stored or used.

3

Maintain the cylinder or container in good working condition with no modifications or damage.

4

Store, handle, and use the cylinder or container so that it will not be damaged.

5

Report any damage or problems to your gas supplier immediately.

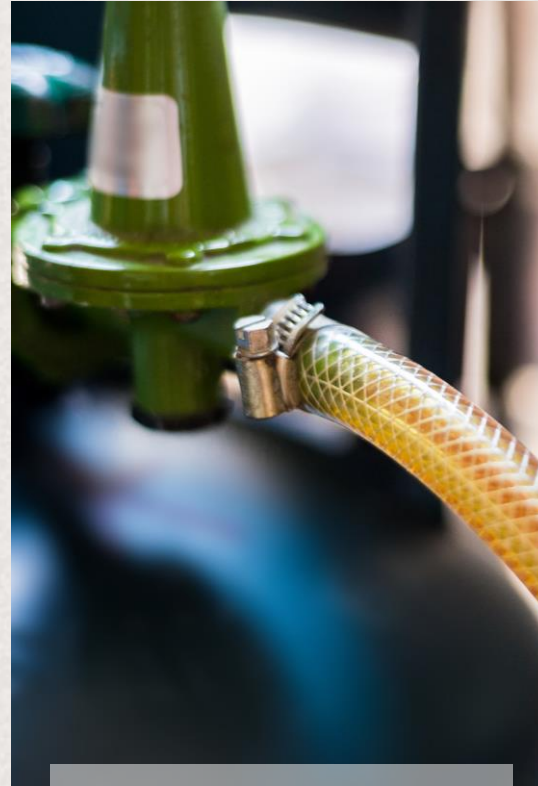
Action Items



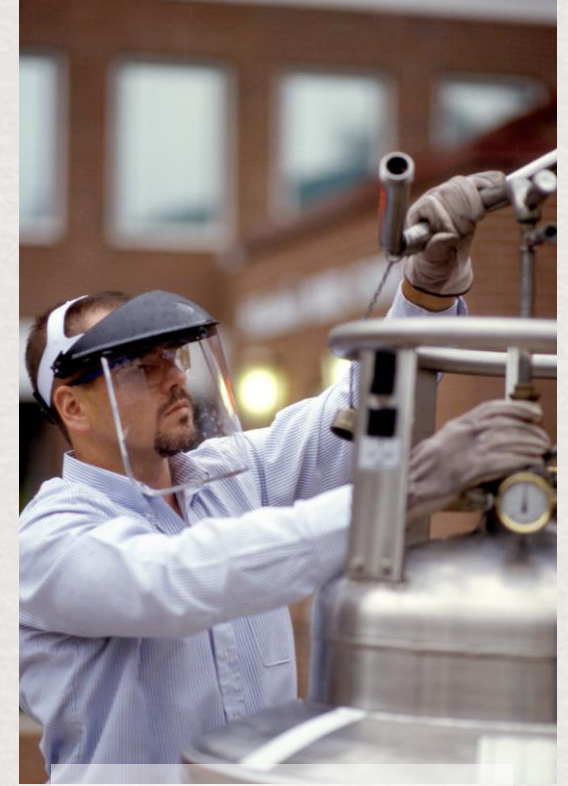
Secure your cylinders.



Use a cart designed for cylinders or containers.



Check piping and connections.



Talk to your gas supplier.



Carbon Dioxide Hazards



When oxygen content is insufficient, someone breathing the air is incapable of realizing the danger because the symptoms are often masked by a state of euphoria. Unconsciousness can occur so quickly that an individual has no warning and cannot help themselves.

As little as one or two breaths in a low oxygen atmosphere can endanger your life.

Intoxication can also occur when there is sufficient oxygen for breathing but the carbon dioxide level is high enough (30,000 ppm) to cause adverse physiological effects.



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UNDERSTANDING CARBON DIOXIDE HAZARDS IN FOOD AND BEVERAGE INDUSTRY



**CARBON DIOXIDE CAN
CREATE A HAZARDOUS
ATMOSPHERE.**

CARBON DIOXIDE (CO₂) CAN BE USED AS A GAS, LIQUID, OR SOLID (DRY ICE). IN THE GASEOUS STATE IT IS ODORLESS, COLORLESS, AND TASTELESS MAKING IT UNDETECTABLE TO PERSONS IN THE AREA. EVEN WHEN ADEQUATE OXYGEN IS PRESENT, EXPOSURE TO CARBON DIOXIDE CAN LEAD TO CO₂ POISONING. AN ASPHYXIATION HAZARD CAN ALSO EXIST. FOLLOW STATE AND LOCAL BUILDING AND FIRE CODES.



**RECOGNIZE AND BE
AWARE OF AREAS WHERE
CO₂ CAN ACCUMULATE**



- ⌚ CO₂ CAN ACCUMULATE IN:
 - ⊕ AREAS WHERE CO₂ IS STORED OR USED, INCLUDING ADJACENT AREAS.
 - ⊕ CONFINED, ENCLOSED, OR LOW-LYING SPACES.
 - ⊕ AREAS WHERE CO₂ IS VENTED.
- ✓ UNDERSTAND AND ADHERE TO POSTED WARNING SIGNS.



**MONITOR AND VENTILATE
FOR CO₂ AS REQUIRED
BY CODE**



- ⌚ CO₂ CAN ACCUMULATE TO DANGEROUS LEVELS EVEN WHEN ADEQUATE OXYGEN IS PRESENT FOR LIFE SUPPORT.
- ⌚ MEASURING OXYGEN CONTENT IS NOT AN EFFECTIVE INDICATION OF THE CO₂ POISONING HAZARD.
- ✓ MAINTAIN ADEQUATE VENTILATION.
- ✓ USE CO₂ DETECTORS WITH AUDIBLE AND VISUAL WARNING DEVICES. ROUTINELY INSPECT, MAINTAIN, AND CALIBRATE DETECTORS.



**NEVER MODIFY OR
TAMPER WITH CO₂
SYSTEMS OR
EQUIPMENT**



- ⌚ CHANGES TO THE GAS SYSTEM CAN CREATE LEAKS OR OTHER HAZARDOUS SITUATIONS. SOME VALVES, REGULATORS, HOSES, AND EQUIPMENT USED FOR OTHER GASES ARE NOT COMPATIBLE WITH CO₂.
- ⌚ DO NOT MODIFY OR TAMPER WITH GAS SUPPLIER OWNED EQUIPMENT.
- ✓ SYSTEM CHANGES SHALL BE EVALUATED AND MANAGED ONLY BY QUALIFIED PERSONS.



**USE REQUIRED
PERSONAL
PROTECTIVE
EQUIPMENT (PPE)**



- ⌚ REFRIGERATED LIQUID CO₂ AND DRY ICE ARE EXTREMELY COLD AND CAN FREEZE TISSUE ON CONTACT. IF SWALLOWED, LIQUID CO₂ AND DRY ICE CAN CAUSE SERIOUS INJURY OR DEATH.
- ✓ WEAR GLOVES AND EYE PROTECTION WHEN HANDLING EQUIPMENT CONTAINING CO₂. ADDITIONAL PPE MAY INCLUDE HEARING PROTECTION, SUPPLIED AIR BREATHING APPARATUS, PERSONAL MONITOR, AND SAFETY SHOES. SEE SAFETY DATA SHEET (SDS) FOR GUIDANCE.



**NEVER ENTER AN AREA OF
HIGH CO₂ CONCENTRATION
WITHOUT PROPER TRAINING
AND PPE**



- ⌚ ENTERING AREAS WHERE HIGH CONCENTRATIONS OF CO₂ EXIST CAN PRESENT AN IMMEDIATE DANGER TO HUMAN LIFE.
- ⌚ BREATHING IN HIGH LEVELS OF CO₂ CAN CAUSE HEADACHE, DIZZINESS, RAPID BREATHING, INCREASED HEART RATE THAT CAN LEAD TO UNCONSCIOUSNESS AND DEATH.
- ✓ ESTABLISH, KNOW, AND PRACTICE EMERGENCY PROCEDURES. EMERGENCY RESCUE SHALL ONLY BE INITIATED BY TRAINED PERSONNEL WHO HAVE THE NECESSARY EQUIPMENT AND SUPPORT.




GAS SUPPLIER



SCAN HERE
FOR MORE
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OR VISIT
WWW.CGANET.COM

REFERENCES  



Near the floor, in low lying areas, in basements, and any confined or enclosed spaces



Fermentation and bright tank areas



Canning and bottling areas



Walk in coolers

NFPA 55, Chapter 13

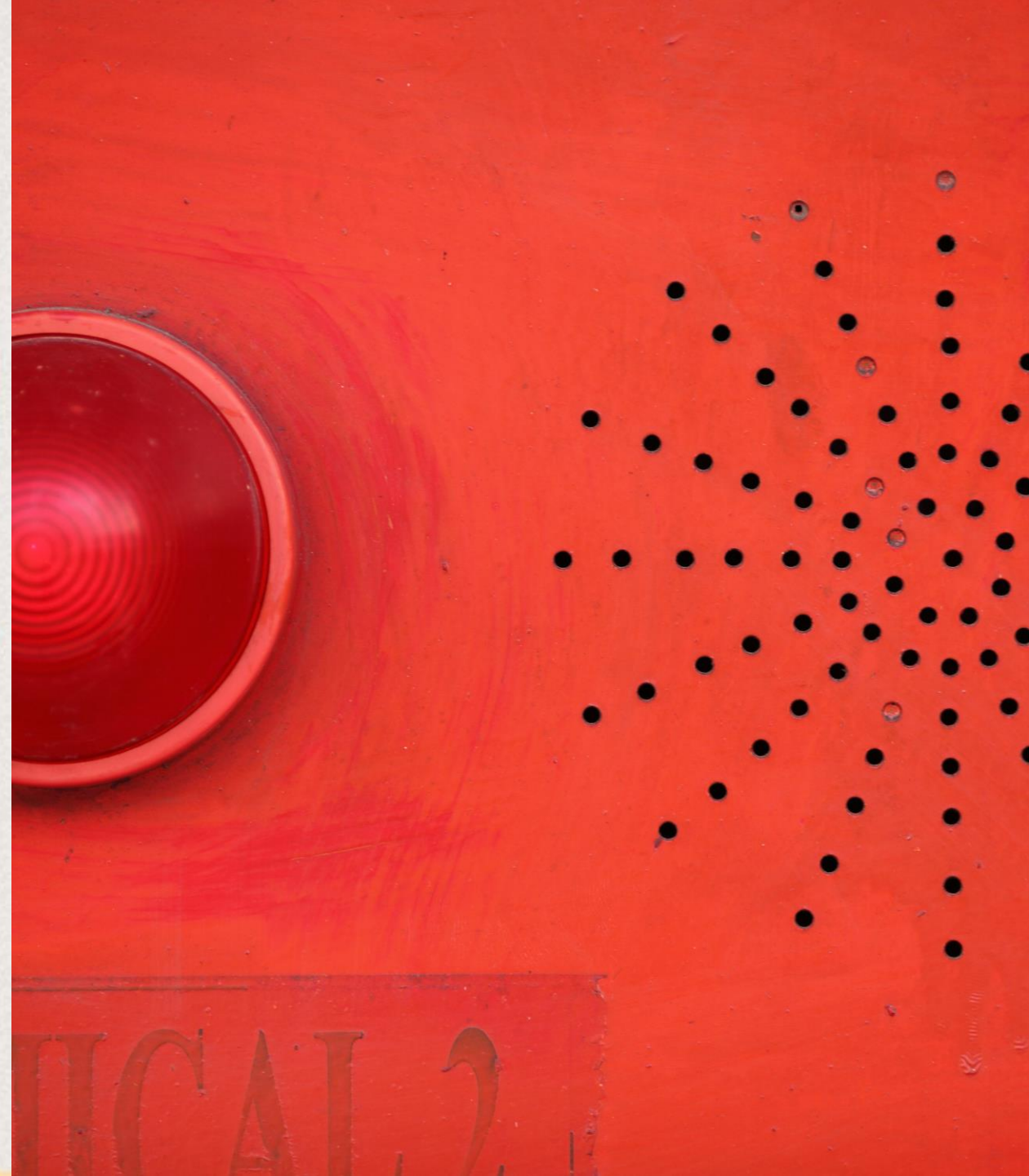
provides requirements for signage, protection, monitoring, and ventilation of carbon dioxide systems.



<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=55>



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CO₂

Action Items

1

Communicate carbon dioxide hazards and hazard response plan to all employees (don't forget the front of house staff).

2

Evaluate your confined and enclosed spaces, indoor and outdoor – are they appropriately marked, ventilated, monitored, and alarmed?

3


Revisit your confined space entry procedures to ensure appropriate monitoring and rescue plans are in place.



Additional Gas Hazards



Consider the unique properties and hazards of other gases you have on site, such as nitrogen and oxygen.



Resources for Craft Brewers

CGA Safety Resources

Safety Posters – Free Resource

www.cganet.com/resources/safety-information/

eLearning Modules

<https://portal.cganet.com/Education/Index.aspx>

Publications

<https://portal.cganet.com/Publication/Index.aspx>



Brewers Association Resources

Educational Publications

<https://www.brewersassociation.org/edu/educational-publications/>

Presentations

<https://www.brewersassociation.org/edu/seminars/>

Trainings & Workshops

<https://www.brewersassociation.org/edu/trainings-workshops/>



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THANK YOU!

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