

# **How Well Do You Really Know Your Brewery Chemicals?**

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Brewers Association Safety Ambassador

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# TODAY'S DISCUSSION

– 1 –

## PREMISE

- Focus is on Safety
- What You Know
- Coded Information
- Procedures, Equipment

– 2 –

## INFORMATION & METHODS

- Substitution and Elimination
- Safe Work Practices
- Engineering Controls
- Administrative Controls
- Personal Protective Equipment

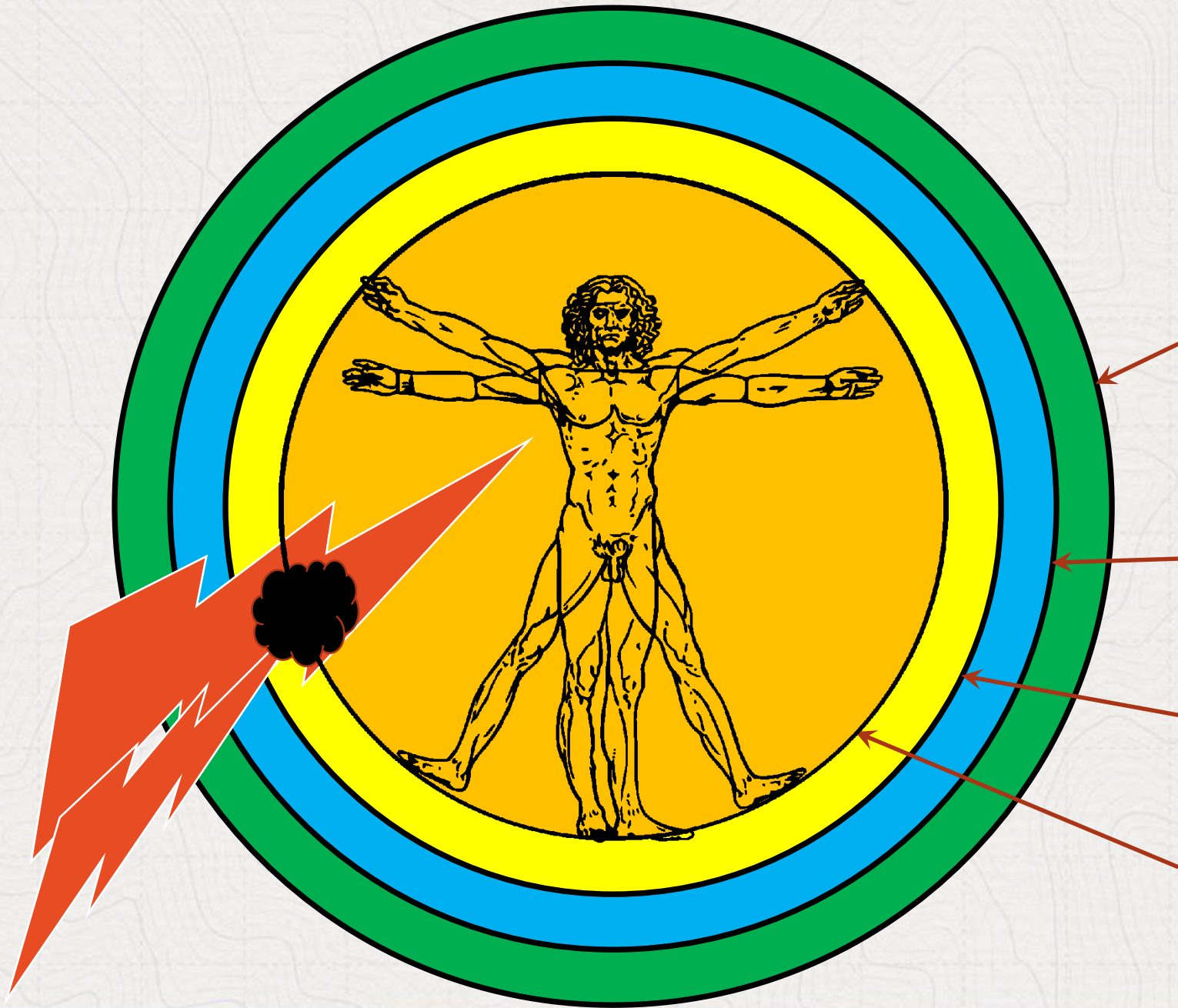
– 3 –

## EXAMPLES

- Caustic / Alkaline Based Cleaners
- Carbon Dioxide



# Prevention & Protection



## Thoughts and Actions

- Safe Work Practices (SWPs)
- Product Substitution/Elimination

## Engineering Controls (ECs)

## Administrative Controls (ACs)

## Personal Protective Equipment (PPE)



– 1 –

# SUBSTITUTION, ELIMINATION AND SAFE WORK PRACTICES

THE “THOUGHTS AND ACTIONS” OF SAFETY



# SUBSTITUTION AND ELIMINATION

## SUBSTITUTION – CHANGE CHEMICALS OR PROCESSES

- Lower concentration PAA = safer oxidizer and flammable
- Acid cleaning under CO<sub>2</sub> for FV/BBT
- Lower pH solid oxidizing cleaners instead of liquid caustic
- Adding surfactant to reduce boilover

## ELIMINATION – REMOVE THE HAZARD ENTIRELY

- Powdered DE filter aid replaced with lenticular filter or centrifuge
- Carbon monoxide eliminated with electric forklift (but hydrogen??)

# SAFE WORK PRACTICES – ATTENTIONING THE HAZARDS

## HOUSEKEEPING



- Keep Labels Visible
- Put Away Equipment

## WALKING, WORKING AND EXITING



- Avoid Spills
- Keep Clear Pathways
- Rehearse Emergency Procedures

## HYGIENE



- Wash PPE and Hands After Chemical Use



– II –

# ENGINEERING CONTROLS

CONTAINING / ISOLATING / CONTROLLING  
HAZARDS WITH EQUIPMENT AND SYSTEMS



# ENGINEERING CONTROLS

## ACTIVE CONTROLS

- Machine Guarding
- Electrical Disconnects
- Ventilation Systems
- Pressure/Vacuum Relief Valves
- Foam Sensor linked to Steam Shutoff
- Hard Transfer Lines

## PASSIVE CONTROLS

- Temperature and Pressure Gauges
- CO<sub>2</sub> Monitor
- Forklift Horn
- Secondary Containment

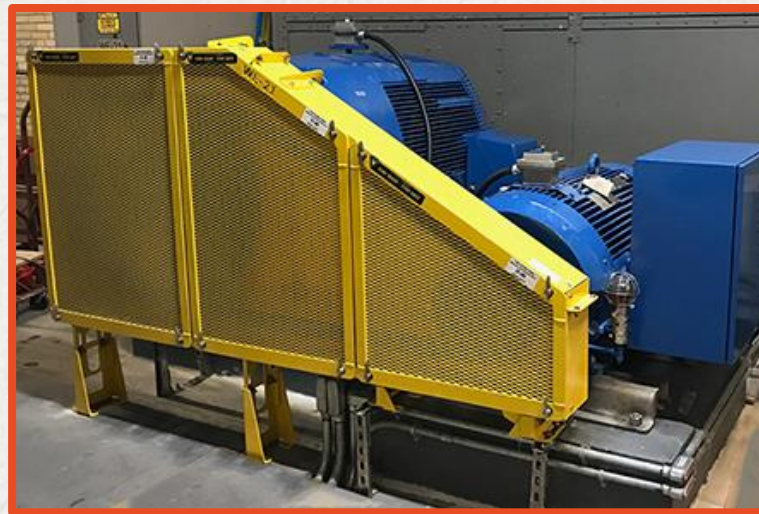
# COMMON CLASSES OF ENGINEERING CONTROLS

## PROCESS CONTROLS



- Brewery Process Automation
- Chemical Metering Pump

## ENCLOSURE AND ISOLATION



- Machine Guarding
- Enclosed Chemical Transfer Lines

## VENTILATION



- Grain Dust Exhaust
- CO<sub>2</sub> Exhaust Blower for Cellar Vessels



# ENGINEERING CONTROLS FOR BREWERY CHEMICALS



**Secondary  
Containment**



**Chemically  
Compatible  
Equipment**



**Ventilation and  
Monitoring**

– III –

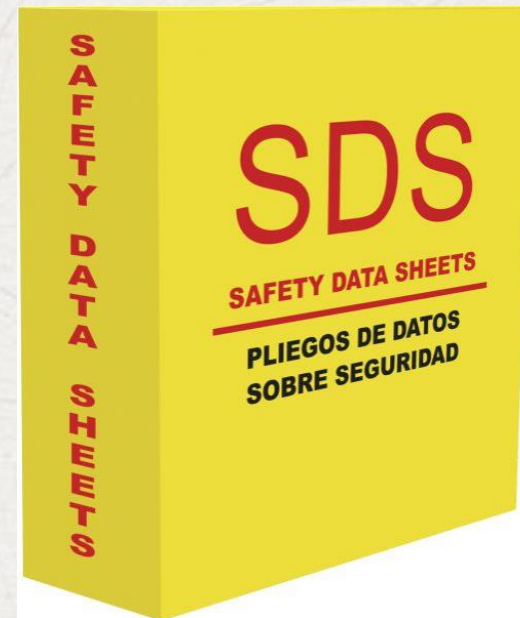
# ADMINISTRATIVE CONTROLS

TRANSMITTING HAZARD INFORMATION  
THROUGH SIGNS, LABELS, TRAINING,  
EMERGENCY ALERTS, POLICIES & RULES



# SAFETY DATA SHEETS (SDSs)

Essential Information on  
Chemical Products, Health  
Effects, Storage, Spill Mgmt.





# Safety Data Sheet

## Spartan Chemical Company, Inc.

Revision Date: 02-Jul-2018

### 1. PRODUCT AND COMPANY IDENTIFICATION

#### Product Identifier

**Product Name:** CAUSTIC CLEANER FP  
**Product Number:** 3189  
**Recommended Use:** Cleaning agent  
**Uses Advised Against:** For Industrial and Institutional Use Only

**Manufacturer/Supplier:** Spartan Chemical Company, Inc.  
1110 Spartan Drive  
Maumee, Ohio 43537 USA  
800-537-8990 (Business hours)  
[www.spartanchemical.com](http://www.spartanchemical.com)

#### **24 Hour Emergency Phone Numbers:**

**Medical Emergency/Information:** 888-314-6171  
**Transportation/Spill/Leak:** CHEMTREC 800-424-9300

### 2. HAZARDS IDENTIFICATION

#### **GHS Classification**

Skin Corrosion/Irritation: Category 1 Sub-category A  
Serious Eye Damage/Eye Irritation: Category 1  
Corrosive to Metals: Category 1

#### GHS Label Elements

**Signal Word:**

**Symbols:**

**Danger**



**Hazard Statements:**

Causes severe skin burns and serious eye damage.  
May be corrosive to metals.

## Most Comprehensive Resource on Hazards, Properties, Management Recommendations

- 16 Standard Sections
- 1<sup>st</sup> Four Sections
  - Product/Co. Info.
  - Hazards (summary)
  - Composition (ranges)
  - First Aid
- Other Sections Include
  - Storage & Disposal
  - Emergencies Mgmt.
  - PPE ♥
  - Chemical Properties



# KEY SDS RECOMMENDATIONS

## READ THEM

- Read SDS for All Chemicals You Use
- Request SDS When Absent
- Ask for Clarification

## DOCUMENTATION

- Record SDS Training
- Refer to SDS in SOPs



## KEEP UPDATED

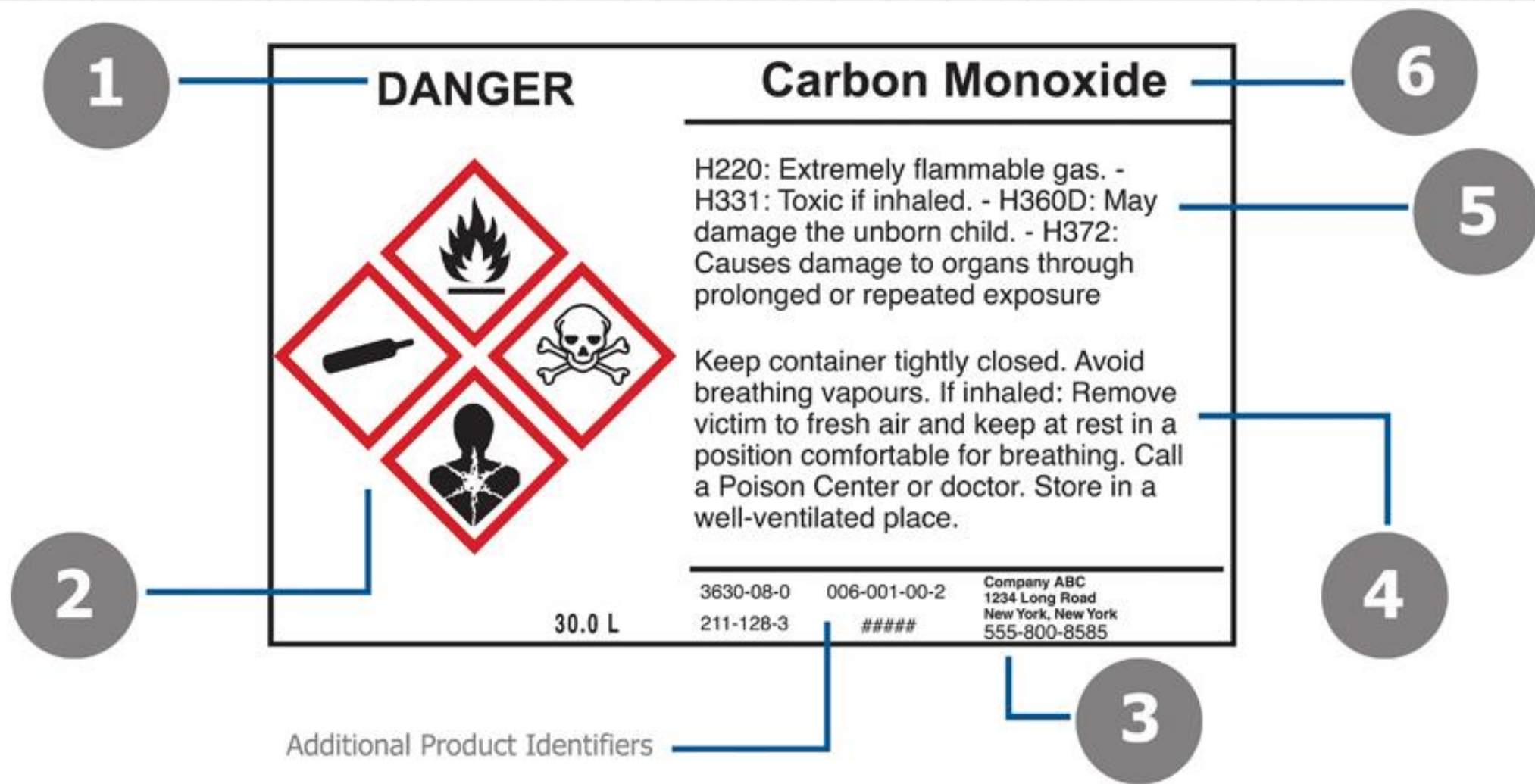
- Binder is Updated & Complete
- Recognized Location
- Available to All

# LABELS

## Cliff Notes Version of the Safety Data Sheet





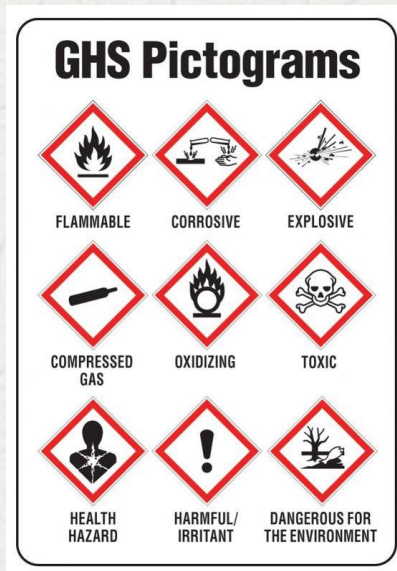


# Chemical Labels Under the Global Harmonized System (GHS), since 2012

## 1. Signal Word

- DANGER
- WARNING

## 2. GHS Pictogram



## 3. Mfr. Info.

- Company
- Address
- Phone Number

## 4. Precautionary / First Aid (P codes)

- General Prevention
- Response, Storage or Disposal
- First Aid Recommendations

## 5. Health & Safety Hazards (H codes)

- Nature and Degree of Hazards Posed
- Codes Tie to SDS

## 6. Product Name / Other Identifiers

- Product Name, Part No.
- Major Chemical Ingredient may be Listed



## Other Helpful Label Info

“HMIS”

### HAZARD INDEX

- Close to NFPA Placard System
- 0-4 Ratings

### PPE RECOMMENDATIONS

- Pictograms Surpass Language Barriers
- Should Agree with SDS
- Workers Still Need Training

## HAZARDOUS MATERIAL IDENTIFICATION GUIDE

### CHEMICAL NAME



### HAZARD INDEX

4 - Extreme Hazard  
3 - Serious Hazard  
2 - Moderate Hazard  
1 - Slight Hazard  
0 - Minimal Hazard

### PERSONAL PROTECTION INDEX

<b>A</b>	<b>G</b>
<b>B</b>	<b>H</b>
<b>C</b>	<b>I</b>
<b>D</b>	<b>J</b>
<b>E</b>	<b>K</b>
<b>F</b>	<b>X</b> Ask your supervisor for special handling instructions.

SmartSign.com • 800-952-1457 • S-9109

# SIGNS

Standardized Key Words and  
Color Schemes for Particular  
Work Areas





# CAUTION

Minor to Moderate  
Injury Potential



Black on Yellow

# WARNING

Death or Serious  
Injury is Possible



Black on Orange

# DANGER

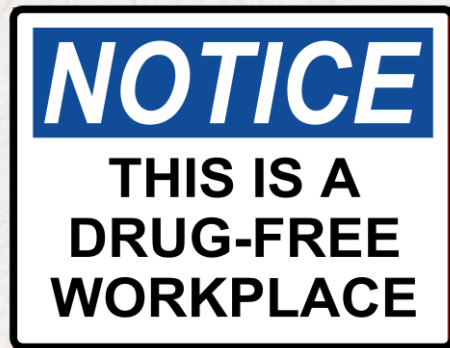
Death or Serious  
Injury Likely



Black and Red on  
White Background

# NOTICE

General  
Information



Blue Panel on White

# SAFETY

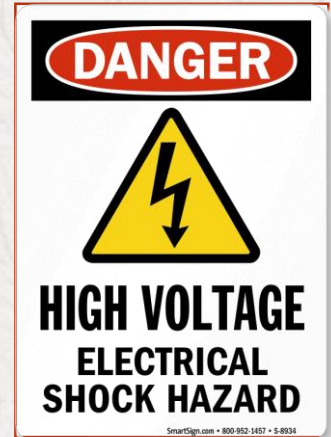
General Safety  
Recommendations



Green Panel on White

# ELECTRICAL & FIRE SAFETY

No Standard Format



Often Red on White



# PLACARDS

Collective Hazards Posted on  
Buildings or Transport Vehicles





# NFPA Rating Explanation Guide




## HEALTH HAZARD

- 4 = Can be lethal
- 3 = Can cause serious or permanent injury
- 2 = Can cause temporary incapacitation or residual injury
- 1 = Can cause significant irritation
- 0 = No hazard

## FLAMMABILITY HAZARD

- 4 = Will vaporize and readily burn at normal temperatures
- 3 = Can be ignited under almost all ambient temperatures
- 2 = Must be heated or high ambient temperature to burn
- 1 = Must be preheated before ignition can occur
- 0 = Will not burn

- ALK = Alkaline
- ACID = Acidic
- COR = Corrosive
- OX = Oxidizing
-  = Radioactive
-  = Reacts violently or explosively with water
-  = Reacts violently or explosively with water and oxidizing

## SPECIAL HAZARD

## INSTABILITY HAZARD

- 4 = May explode at normal temperatures and pressures
- 3 = May explode at high temperature or shock
- 2 = Violent chemical change at high temperatures or pressures
- 1 = Normally stable. High temperatures make unstable
- 0 = Stable



# NFPA PLACARD



WORST CASE:  
B. B. L. C.



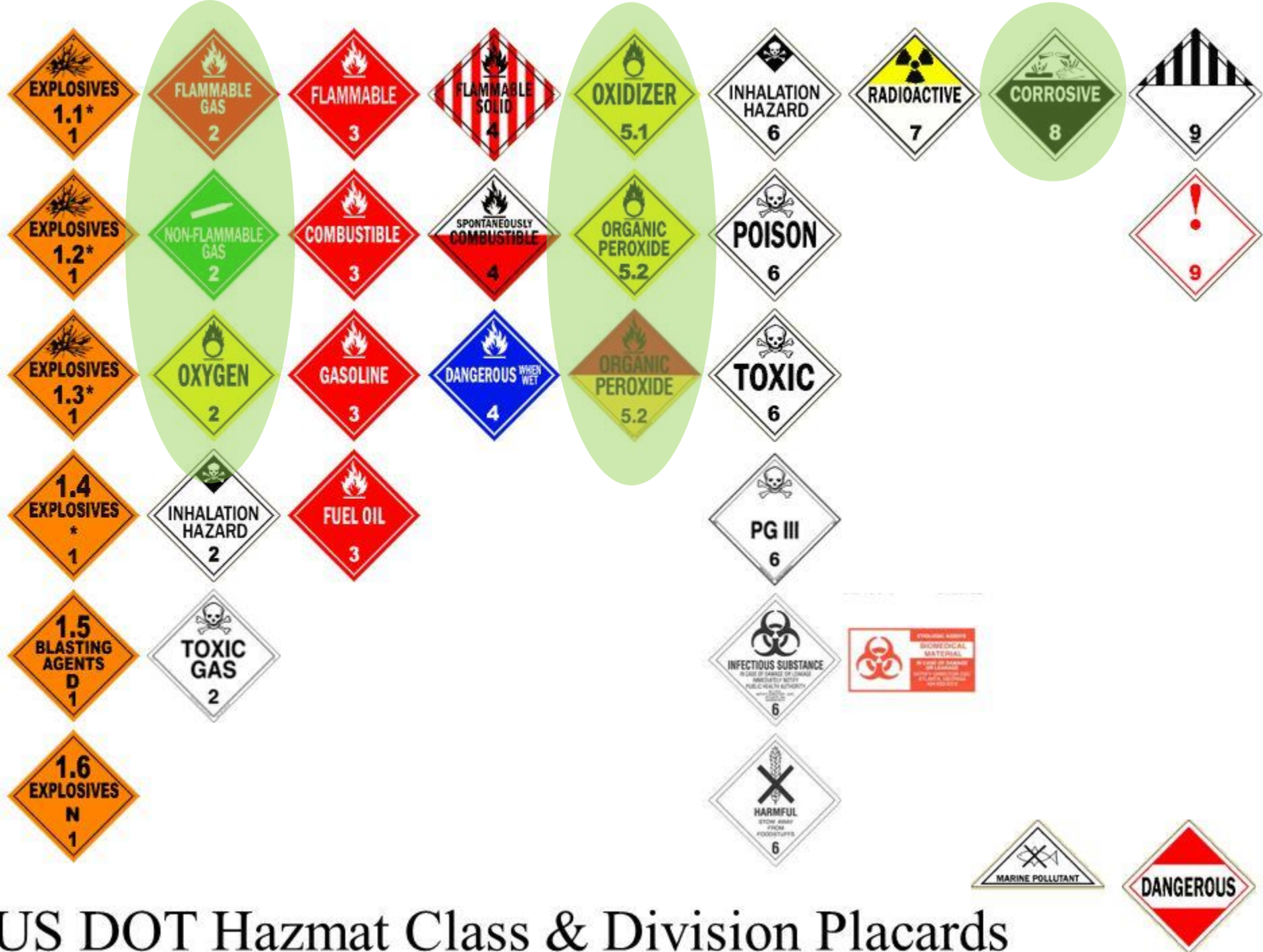
# DOT HAZARD CLASSES AND PLACARDS

SPECIFIC TO D.O.T.  
REGULATIONS

i.e. FOR CONTAINERS  
AND TRANSPORT  
VEHICLES







US DOT Hazmat Class & Division Placards

# CHEMICAL INFORMATION REVIEW - Example for Peracetic Acid

## SDS

**Safety Data Sheet**  
**Spartan Chemical Company, Inc.**

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**2. HAZARDS IDENTIFICATION**

GHS Classification  
Skin Corrosion/Irritation: Category 1 Sub-category A  
Serious Eye Damage/Eye Irritation: Category 1  
Corrosive to Metals: Category 1

GHS Label Elements  
Signal Word: Danger

Precautionary Statements:  
Prevention: Do not breathe mist, vapors or spray. Wash hands and any exposed skin thoroughly after handling. Wear protective gloves. Wear eye / face protection. Wear protective clothing. Keep in original or other corrosion resistant container. IMMEDIATELY CALL A POISON CENTER.

Response:  
-Eyes: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
-Skin: IF ON SKIN (or hair): Take off contaminated clothing. Wash thoroughly with soap and water. If irritation occurs, seek medical advice.  
-Inhalation: IF INHALED: Remove victim to fresh air and keep at rest. Breathing apparatus should be worn if necessary.  
-Ingestion: IF SWALLOWED: Rinse mouth with water. Do not induce vomiting. Seek medical advice.  
-Specific Treatment: See Safety Data Sheet Section 8.

Spill:  
Storage: Absorb spillage to prevent run-off. Store in original container. Store locked up. Store in cool, dry place.

**SAFETY DATA SHEETS**

**SDS**

**PLIEGOS DE DATOS SOBRE SEGURIDAD**

## LABEL

**CAUSTIC CLEANER FP**

**DANGER** ☐ WARNING

Causes severe skin burns and serious eye damage. May be corrosive to metals.

Do not breathe mist, vapors or spray. Wash hands and any exposed skin thoroughly after handling. Wear protective gloves. Wear eye / face protection. Wear protective clothing. Keep in original or other corrosion resistant container. IMMEDIATELY CALL A POISON CENTER.

**HMIS**  
3 HEALTH  
1 FLAMMABILITY  
1 REACTIVITY  
C PERSONAL PROTECTION

**NFPA**  
1  
3  
1  
OX

**SUPPLIER INFORMATION**  
NAME: Spartan Chemical Co. 800-537-8990  
ADDRESS: 1110 Spartan Drive, Maumee, Ohio 43537 USA

## SIGNS



## PLACARDS





**– IV –**

# **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

THE LAST LINE OF DEFENSE

# PPE

## LIMITATIONS

- NOT Failsafe
- Last Line of Defense
- Poor Understanding
  - Selection
  - Use
  - Cleaning
  - Inspection
  - Replacement

## CHEMICAL PPE CAN PROTECT

- Eyes / Face
- Hands
- Feet
- Other Parts
- Lungs



# EYE PROTECTION

## FROM SPLASHES

- Standard Safety Glasses
- Indirect Vented Goggles
- Face Shield



# HAND PROTECTION

## FROM DIRECT CONTACT

- Inexpensive disposable nitrile
- Neoprene hybrid over woven or latex base
- Heavy duty reusable nitrile

Nitrile Disposable  
Low hazard use

Neoprene Hybrid  
Mod hazard use



Heavy Nitrile  
Acids, Bases, Sanitizers  
Mod/High hazard use



# FOOT PROTECTION

## FROM SPILLS, PUDDLES, CONTAINER WEIGHT

- Sturdy leather or synthetic work shoes/boots with reinforced toe and shank
- Knee-high rubber (PVC) with reinforced toe and shank
- Low-rise rubber (PVC) with reinforced toe and shank or rubber pullover over sturdy work boot



# OTHER PROTECTION

## VARIOUS HAZARDS

- Splash protection apron
- Fall protection harness, lanyard, and anchoring
- Hearing protection, disposable or reusable





# RESPIRATORY PROTECTION

None of These Work in the  
Absence of Sufficient Oxygen!!

## FROM DUSTS, MISTS, VAPORS, AEROSOLS

- Chemical Mists/Vapors
  - Brewery Washdown
  - Paints, Coatings, Solvents
- Particulate protection
  - Grain Dust
  - DE Filter Aids
  - Metal, Wood, Plastic Fabrication/Welding





# TOTAL MINDSET FOR PREVENTION AND PROTECTION AROUND CHEMICALS

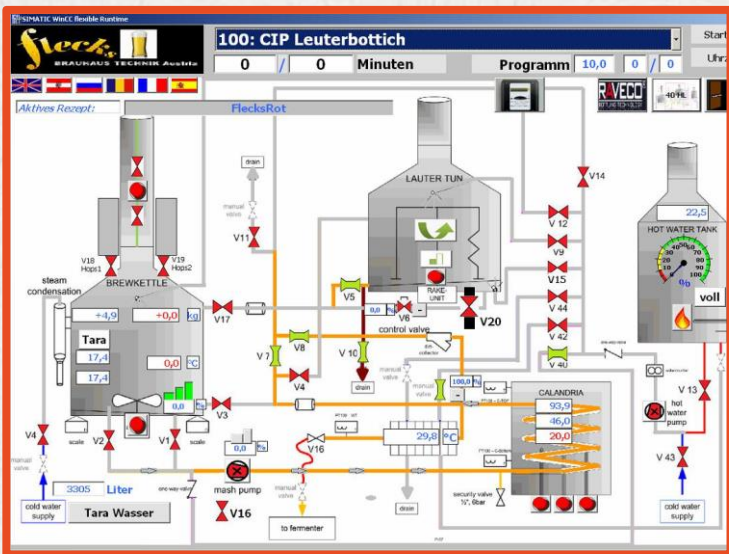
1 SWP



3 AC



2 EC



4 PPE





# SOME EXAMPLES

MORE INFORMATION AVAILABLE  
IN YOUR SDS BINDER

# CHEMICALS IN BREWERIES/PUBS

1

## CORROSIVES

- Acid Cleaners
- Caustic Cleaners
- Alkaline Powders

2

## OXIDIZERS

- Hydrogen Peroxide
- Peracetic Acid
- Nitric Acid / Iodine
- Ozone
- Chlorine Dioxide

3

## OTHER BEER PRODUCTION

- Non-Oxidizing Sanitizers (Quats)
- Glycol Coolant
- Lab Reagents
- Water Treatment
- Filter Aids
- Glues



# 4

## ASPHYXIANTS

- **SIMPLE**
  - Carbon Dioxide
  - Nitrogen
- **CHEMICAL**
  - Carbon Monoxide
- **OXYGEN**
  - Ambient: 20.9%
  - Deficient: <19.5%
  - Enriched: >23%

# 5

## FLAMMABLES

- Alcohols
- Propane
- Natural Gas

# 6

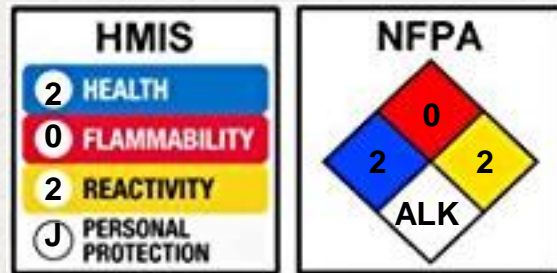
## FACILITIES CHEMICALS

- Lubricants
- Paints
- Janitorial
- Pest Control
- Food Service

# EXAMPLE 1 – CAUSTIC / ALKALINE CLEANER

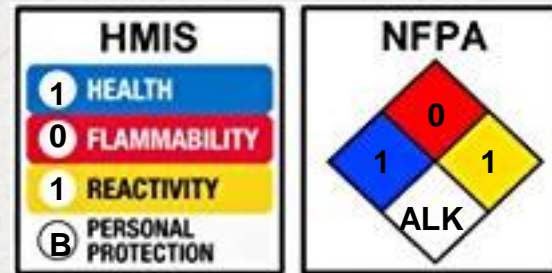
## STOCK SOLUTION

- DANGER
- pH: 12.8 - >14



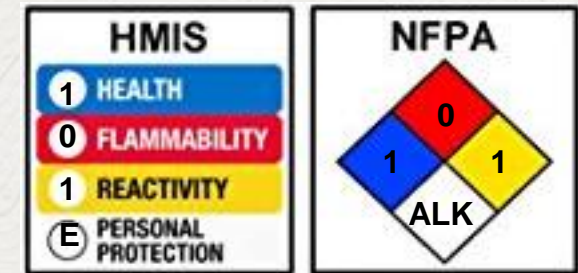
## WORKING SOLUTION

- DANGER
- pH: 12 - 14



## SUBSTITUTION with ALKALINE SOLID

- DANGER
- pH: 11.0 - 11.5

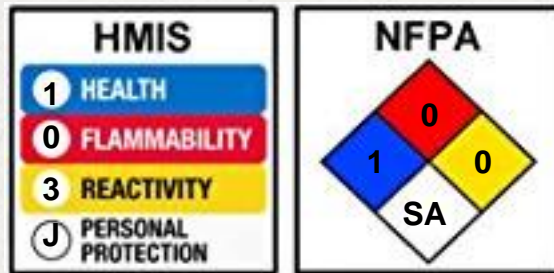




## EXAMPLE 2 – CARBON DIOXIDE

### PURE CO<sub>2</sub>

- WARNING
- DOT HC 2.2

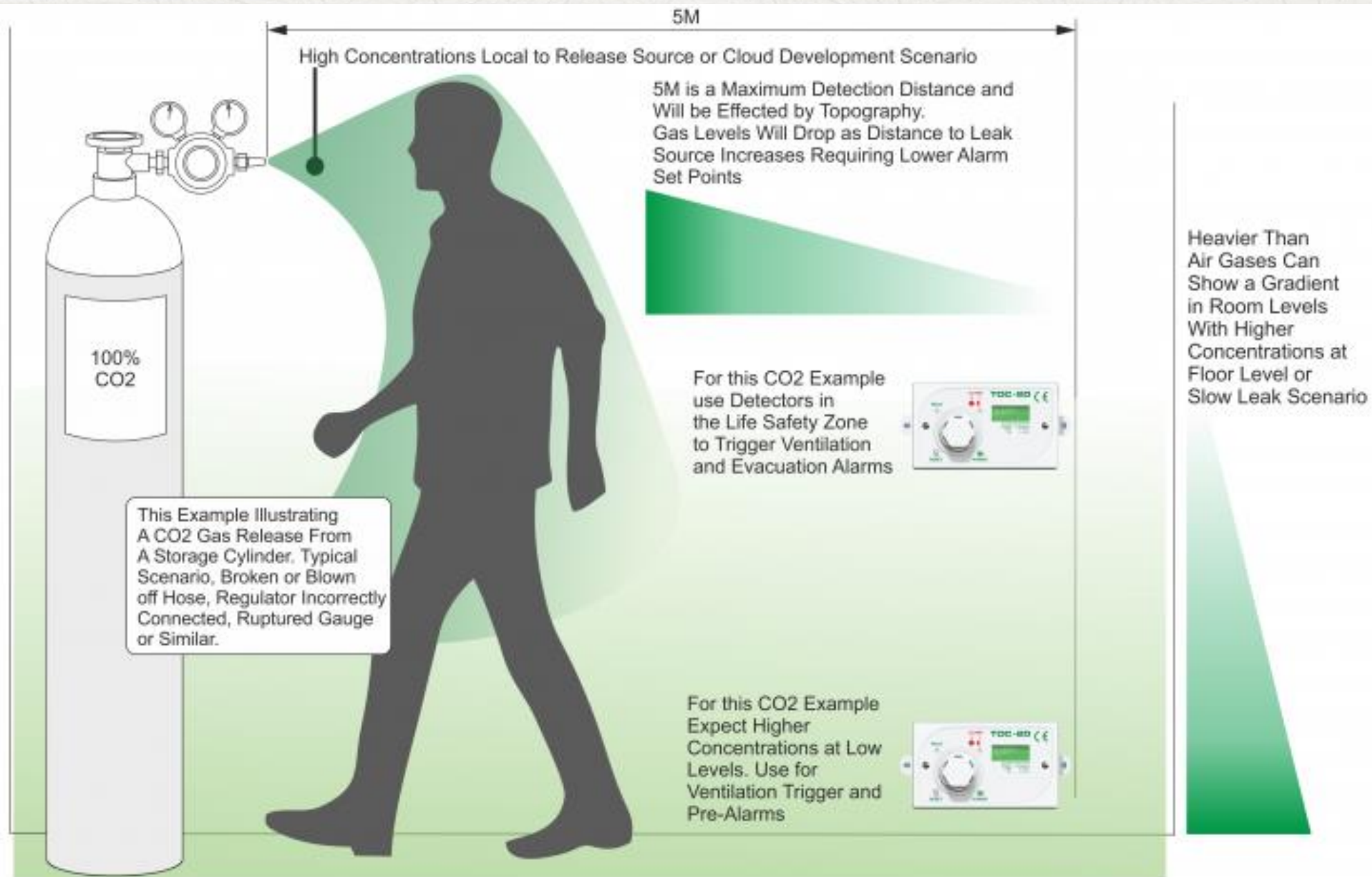


### PROPERTIES (from the SDS)

- COLORLESS
- ODORLESS
- POOR WARNING
- VAPOR DENSITY  
1.53 (air=1.00)

### CONCENTRATIONS TO CONSIDER

- AMBIENT AIR  
400 ppm (0.04%)
- PEL/TLV TWA  
5,000 ppm (0.5%)
- FIRST SYMPTOMS  
15,000 ppm (1.5%)
- IDLH  
40,000 ppm (4%)
- UNCON. / DEATH  
80,000 ppm (8%)





## EXAMPLE 3 – CARBON DIOXIDE – POINTS OF EXPOSURE



# SUMMARY



# Now, How Well Do You Really Know Your Brewery Chemicals?

## Chemical Safety Information is All Around Us

- Often is Coded
- May be Absent or Damaged
- May be Wrong

## SDSs, Labels, Signs, Placards

- Up to Date
- Visible
- Correct for Situation

## Controls and PPE

- Appropriate
- In Good Repair
- Used Correctly



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@MattStinchfield

@BrewersAssoc

#BrewerySafety

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