CRAFT BREWERS CONFERENCE
& BrewExpo America

Brewery Safety Bootcamp

2019 Craft Brewers Conference, Denver

BA BREWERS ASSOCIATION

SAFETY RECRUITS - WELCOME TO BOOTCAMP!

A QUICK OVERVIEW OF THE CLASS

Housekeeping

- 11:30 am – 2:30 pm
  - Stay throughout
  - Complete the quiz
  - Earn Essential Safety Documentation
- Restrooms, fire alarms, exits, AEDs
- Scheduled break ca. 1:15 pm
- Fast Moving Class
  - Get Up and Move
  - Permission to Laugh!

Larry Horwitz

Board of Directors

Brewers Association

Boulder, Colorado

Matt Stinchfield

Safety Ambassador

Brewers Association

Andrew Dagnan

Environ. and Safety Mgr.

Breckenridge Brewery

Andy Clearwaters

Health and Safety Mgr.

Bell's Brewery

Chris Bogdanoff

Head Brewer

Heroes Restaurant and Brewery

Tony McCrimmon

Principal

Brewery Safety Consulting

Brian Godfrey

Senior EHS Specialist

TRC Companies, Inc.

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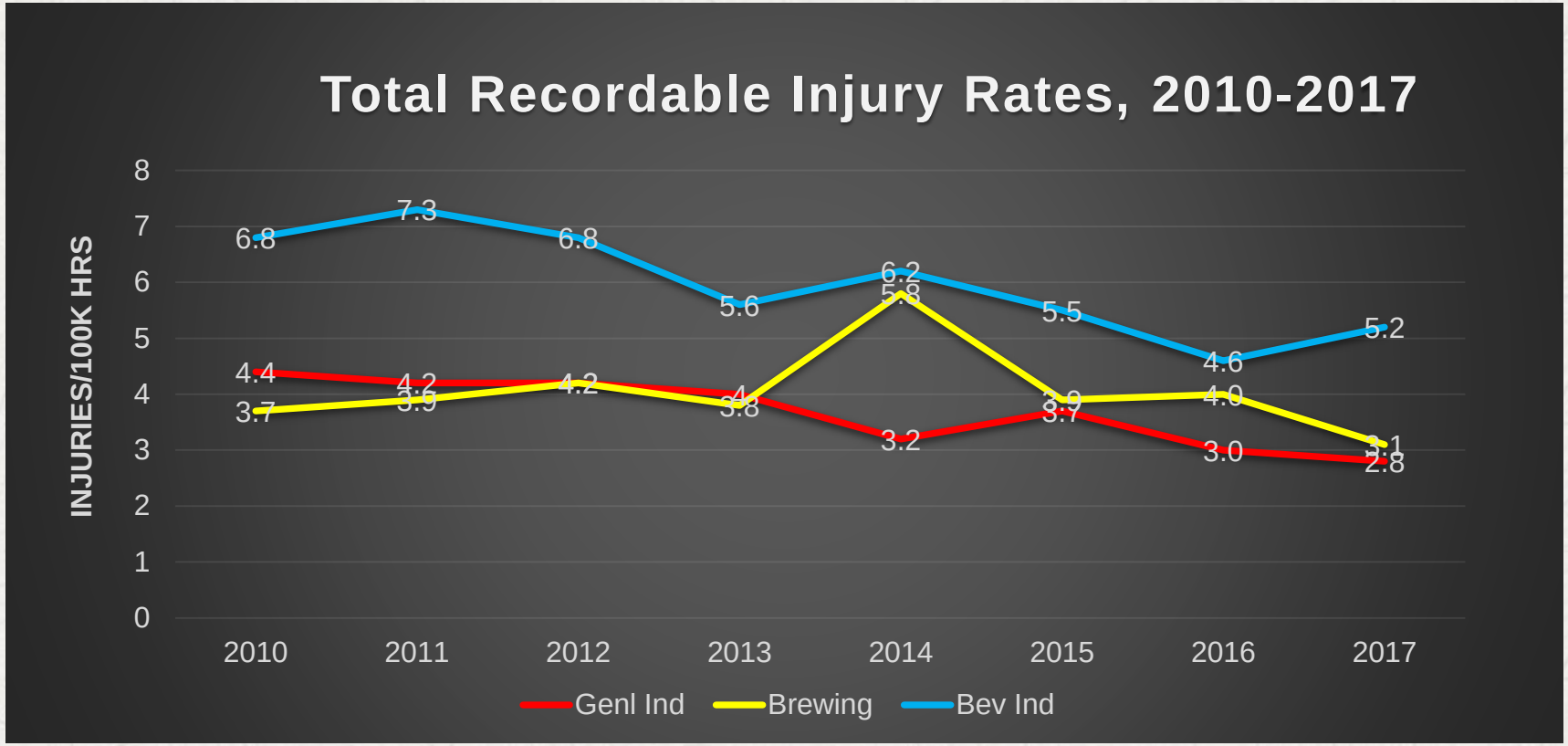
SAFETY CLIMATE OF THE CRAFT BEER INDUSTRY

Injury Rates Are Down!



Bureau of Labor Statistics

- Injury rates continue downward trend
- Can we continue to improve in 2019 and beyond?
- Breweries lowest rate of all beverage manufacturers

OSHA, OSHA Consultation, and Trade Association Alliances

Region V – Ohio
Region VIII - Colorado

GENERAL DUTY CLAUSE

Employer creates a “safe and healthful workplace”

Employees abide by safety instructions, use equipment provided

OSHA REGS ARE MINIMUM REQ’D

Employers can customize, as long as minimums are met

Documentation of hazards, compliance, and training are essential

HOW TO CREATE A SAFE AND HEALTHFUL WORKPLACE?

Employ the Hazard Assessment Process

Matt Stinchfield

Safety Ambassador

Brewers Association

Boulder, Colorado

@MattStinchfield

#SafetyAmBadAssador

mstinchfield

HAZARD ASSESSMENT OVERVIEW

DOCUMENTING SAFETY AND PROCEDURES

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What is Safety?

Freedom from hazards in the workplace

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Hazard Assessment

1. Outline steps in task
2. Identify hazards
3. Specify hazard controls
4. Revise procedure to include controls

1. **Understand the task or process**
2. **Imagine what could go wrong, i.e. hazards and outcomes**
3. **Think creatively for ways to prevent or reduce the hazards**
4. **Document your findings in writing, i.e. SOP**

Caustic Washing of a Beer Tank

1. Set up CIP Machine

2.Dispense Caustic

3. Run Caustic in Tank

1 - Outline the Steps

Basic Outline of Steps in the Task

1. Connect CIP to FV
2. Fill CIP Tanks
3. Load Caustic
4. Circulate Caustic
5. Drain Caustic
6. Load Rinse
7. Circulate Rinse
8. Drain Rinse & Air Dry

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(opt.) Drill Down to Instruction Level

a. Add cool water to left tank up to overfill tube

b. Add hot water to right tank up to 1” below overfill tube

c. Dispense 4,000 ml caustic into plastic beaker

d. Add caustic to right (hot) tank

e. Rinse beaker and put back on caustic drum

2 - Identify Hazards

NO.	STEP	HAZARDS
1	CIP to FV	Slips & Trips, Electrical
2	Fill CIP Tanks	Slips & Trips, Temperature, Concentrated Caustic
3	Load Caustic	Slips & Trips, Temperature, Dilute Caustic
4	Circulate Caustic	Slips & Trips, Temperature, Dilute Caustic
5	Drain Caustic	Slips & Trips, Temperature, Dilute Caustic
6	Load Rinse	Slips & Trips
7	Circulate Rinse	Slips & Trips
8	Drain Rinse	Slips & Trips

3 – Specify Hazard Controls

Identified Hazards for Step 2, Filling the CIP Tanks

NO.	STEP	HAZARDS
2	Fill CIP Tanks	Slips & Trips, Temperature, Conc. Caustic

Slips and Trips Hazard Controls

PREVENTION (SWP & AC)	PROTECTION (EC & PPE)
Avoid walking in puddles	Textured surfaces
Keep eyes on the floor	Slotted drain covers (not open)
Walk like a duck (lower ctr. of grav.)	Waterproof, slip resistant boots
Organize or stow hoses and cords	

Hot Temperature Hazard Controls

PREVENTION (SWP & AC)	PROTECTION (EC & PPE)
Stand back when filling, recirculating	Thermostatic temp. control
Disconnect tri-clamps carefully with valves closed	Long pants, long sleeved shirt
	Rubber boots, rubber gloves, safety glasses

Concentrated Caustic Hazard Controls

PREVENTION (SWP & AC)	PROTECTION (EC & PPE)
Read, understand SDS; Observe labels & placards	Appropriate pumps, non-reactive
Trained in chemical handling	Long pants, long sleeved shirt
Good housekeeping	Rubber boots, gloves, apron
Rinse affected surfaces	Goggles & splash shield
Dispense where/when others will not be affected	

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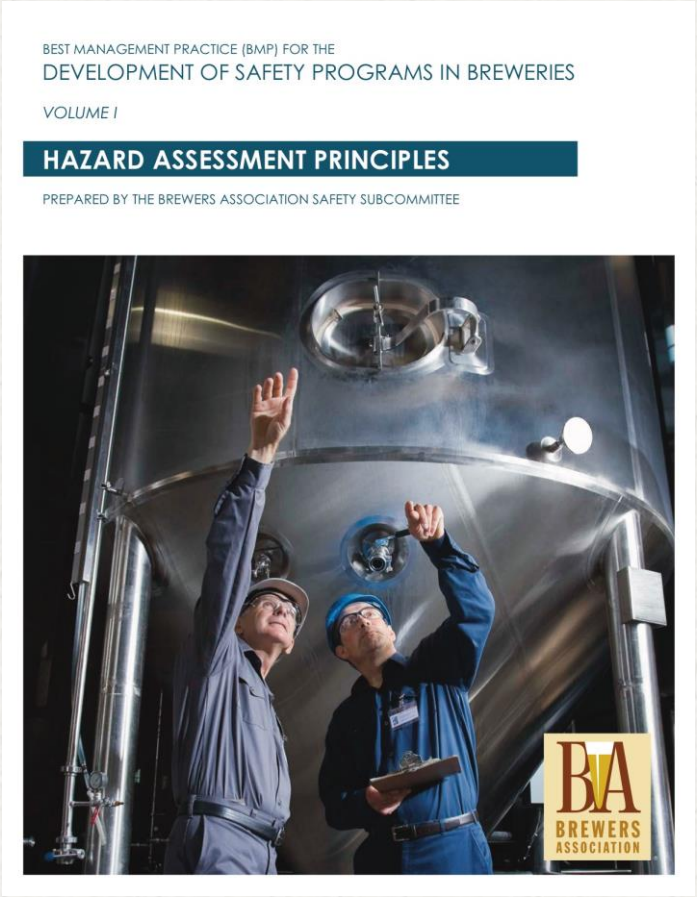
4 – Write/Revise Your S.O.P.

Original Outline of Steps, plus Procedural Instructions and Hazard Controls

1. Connect CIP to FV
2. Fill CIP Tanks
3. Load Caustic
4. Circulate Caustic
5. Drain Caustic
6. Load Rinse
7. Circulate Rinse
8. Drain Rinse & Air Dry

Hazard Assessment BMP



Hazard Assessment Form

TASK:	HA DATE:
DEPT:	INITIALS:

STEP	DESCRIPTION	HAZARDS	CONTROLS	PPE	FMEA NO.

SOP FORM

TASK: _____	SOP NO: ____ REVISION DATE:_____
DEPT: _____	INITIALS: _____

1) Purpose

This SOP describes Brewery _____'s procedure for safe and effective _____.

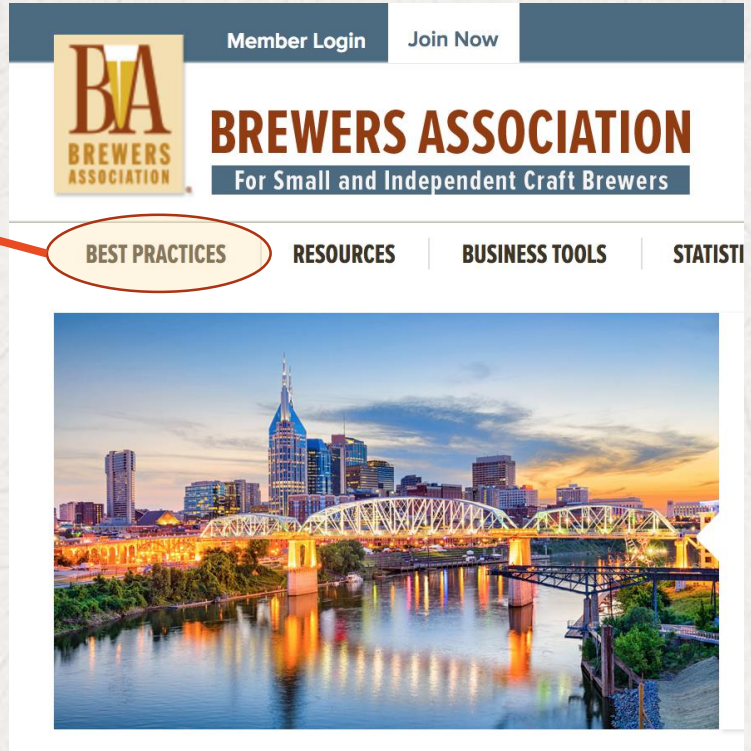
2) Scope

This SOP is limited to _____.

BA BREWERS ASSOCIATION

BEST PRACTICES | RESOURCES | BUSINESS TOOLS | STATISTICS | GOVERNMENT AFFAIRS | GUILD

- Industry Updates
- Brewery Safety
  - FREE Online Safety Training
  - Safety Ambassador
  - Safety Exchange
  - Hazard Assessment Principles
  - Confined Spaces
  - Protective Clothing
  - Powered Industrial Trucks
  - Compressed Gas Cylinders Management
  - Surviving an OSHA Inspection
- Good Manufacturing Practices for Craft Brewers
- Engineering
  - Design and Construction of Brewery Quality Labs
- Hops
  - Hop Breeding Program
  - Grower Codes
  - Cost of Hop Production
  - Hop Resources
- Malt
  - Barley Characteristics
  - Managing Supply Chain Quality
  - Barley Resources
- Sustainability
  - Sustainability Manuals
  - Sustainability Benchmarking Tools
  - Sustainability Ambassador
- Quality
  - Quality Priority Pyramid
  - FSMA FAQs for Brewers
  - Food Safety Plan for Craft Brewers
  - Quality Ambassador
  - ASBC Methods of Analysis
  - Quality Management Book
  - Guide to Quality Craft Beer
  - Date Lot Coding
  - Basics of Beer Quality Workshop
- Draught Beer Quality
  - Draught Beer Quality Ambassadors
  - Draught Quality Resources
- Kegs
  - Guidelines
  - Repatriation



EXAMPLE HAZARD ANALYSIS

TASKS

- Examples of typical brewery tasks that carry one or more hazards

EXAMPLE HAZARD ANALYSIS

HAZARDS
–
OUTCOMES

- Some bad things that can happen to you if you experience the hazard

EXAMPLE HAZARD ANALYSIS

CONTROLS

- Substitution or Elimination
- Safe Work Practices
- Engineering Controls
- Administrative Controls
- PPE

Another Great Presentation This Week

OSHA Safety Consultation

Tuesday, 2:40-3:40, Mile High 4

Moderator: Matt Stinchfield with
Four Distinguished Panelists

Andy Clearwaters

Health and Safety Manager

Bell's Brewery

Comstock, Michigan

andy-clearwaters-3069989a

WALKING AND WORKING SURFACES & HOUSEKEEPING

AVOIDING SLIPS, TRIPS AND FALLS…

…AND OTHER HORRIBLE INCIDENTS

BA BREWERS ASSOCIATION


MOVIECLIPS.COM

WALKING AND WORKING SURFACES…

…Wherever Your Feet Touch

- Floors
- Elevated surfaces
- Ladders

Why Are They Important?

- We interact with them constantly
- Slips and falls account for 15% of accidental deaths
- OSHA regulates them
- Let me tell you a story

WALKING AND WORKING SURFACES HAZARD ANALYSIS

TASKS

- Daily brewery work
- Brew deck stairs
- Tank cleaning
- Dry hopping

HAZARDS

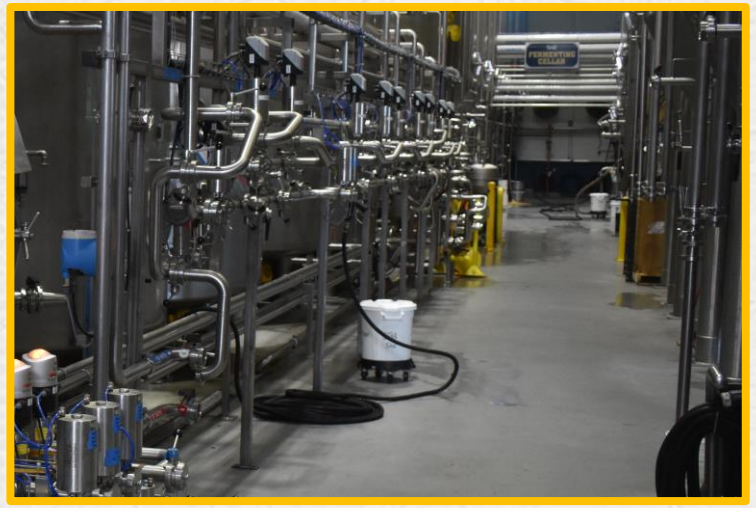
- Slips, trips, falls
- Falls from height
- Falling items
- Increased severity of other incidents
- Electrocution

CONTROLS

- Good housekeeping
- Proper use of surfaces and ladders
- Fall Protection
- SWP – caution
- Emergency planning and egress

WALKING AND WORKING SURFACES

GENERAL REQUIREMENTS



General Requirements

- Good condition
- Clean
- Orderly
- Good lighting

Examples in Brewery

- Hoses, cords, buckets
- Wet surfaces and chemical puddles
- Drains, older floors
- Clutter

WHY IS GOOD HOUSEKEEPING IMPORTANT?

Eliminates Hazards

- Slips and trips (water, ice, glycol, dust)
- Emergency egress
- Access to critical devices
  - Eyewash stations
  - Fire extinguishers
- Falling items (wrench on a ladder)
- Combustible dust build up

Increased Efficiencies

- Better flow of materials and byproducts
- Inventory control
- Effective use of space
- Reduced janitorial services
- Greater productivity
- Improved worker morale

GOOD HOUSEKEEPING BEHAVIORS

GOOD HABITS

- Put away tools/equipment after each task
- Manage hoses, cords, and drain grates (“good hose-keeping”)
- Label storage areas
- Position storage space close to work areas
- Keep brooms, mops, squeegees, spill cleanup supplies on hand & in good repair
- Wear PPE appropriate for the housekeeping activity
- Develop SOPs for common housekeeping activities

LADDER USE – ALL WRONG!!!

LADDER USE

Rolling Platforms

- Nice to use
- Electricity and metal don’t mix

Step Ladders

- Stepladder only used in locked-open position
- No lean against tanks
- Do not stand on top two steps/rungs

Extension Ladders

- 4 to 1 pitch
- If exiting, extend 3ft above the surface exiting to

Fixed Ladders

- Before installation understand the rules around clearance and fall protection.

LADDER USE – MUCH BETTER!!!

3 POINTS OF CONTACT RULE

BELT BUCKLE RULE

REMEMBER

Most Falls Occur from Lower Heights

- Majority of fall deaths are less than 4 ft drop
- That “dangerous feeling”

ELEVATED WORK SPACES

GENERAL REQUIREMENTS

Engineering Controls

- “Engineer it Out”
- Guard rails/toe boards
- Equipment below
- Guard openings

Fall Protection Systems

- ABC’s
- #1 Rule…
  Don’t hit the ground

A KEY SAFE WORK PRACTICE IS TO…

WALK LIKE A DUCK

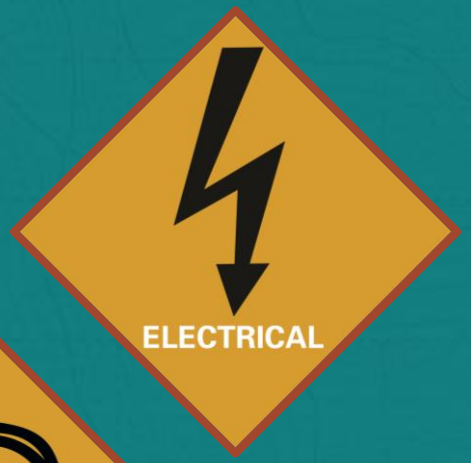
Tony McCrimmon

Principal

Brewery Safety Consulting

Aurora, Colorado

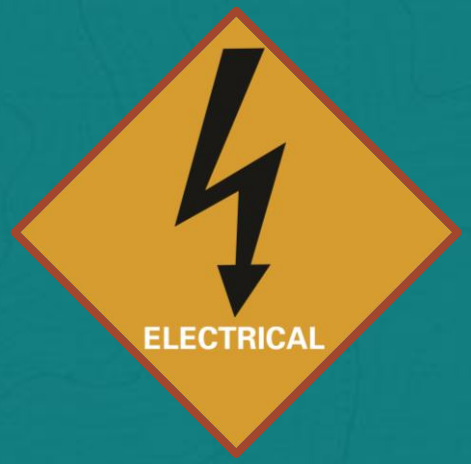
tony-mccrimmon-30852543



PHYSICAL HAZARDS

ELECTRICITY, PRESSURE, NOISE, MOVING PARTS AND GRAVITY

ELECTRICAL HAZARDS



U.S. workers	Number	Effect
Yearly	4,000	Non-disabling electrical shock injuries
Yearly	3,600	Disabling electrical shock injuries
Every year	2,000+	Sent to burn centers with electrical burns

Every day at least 1 person is electrocuted at work

ELECTRICAL HAZARD ASSESSMENT

TASKS

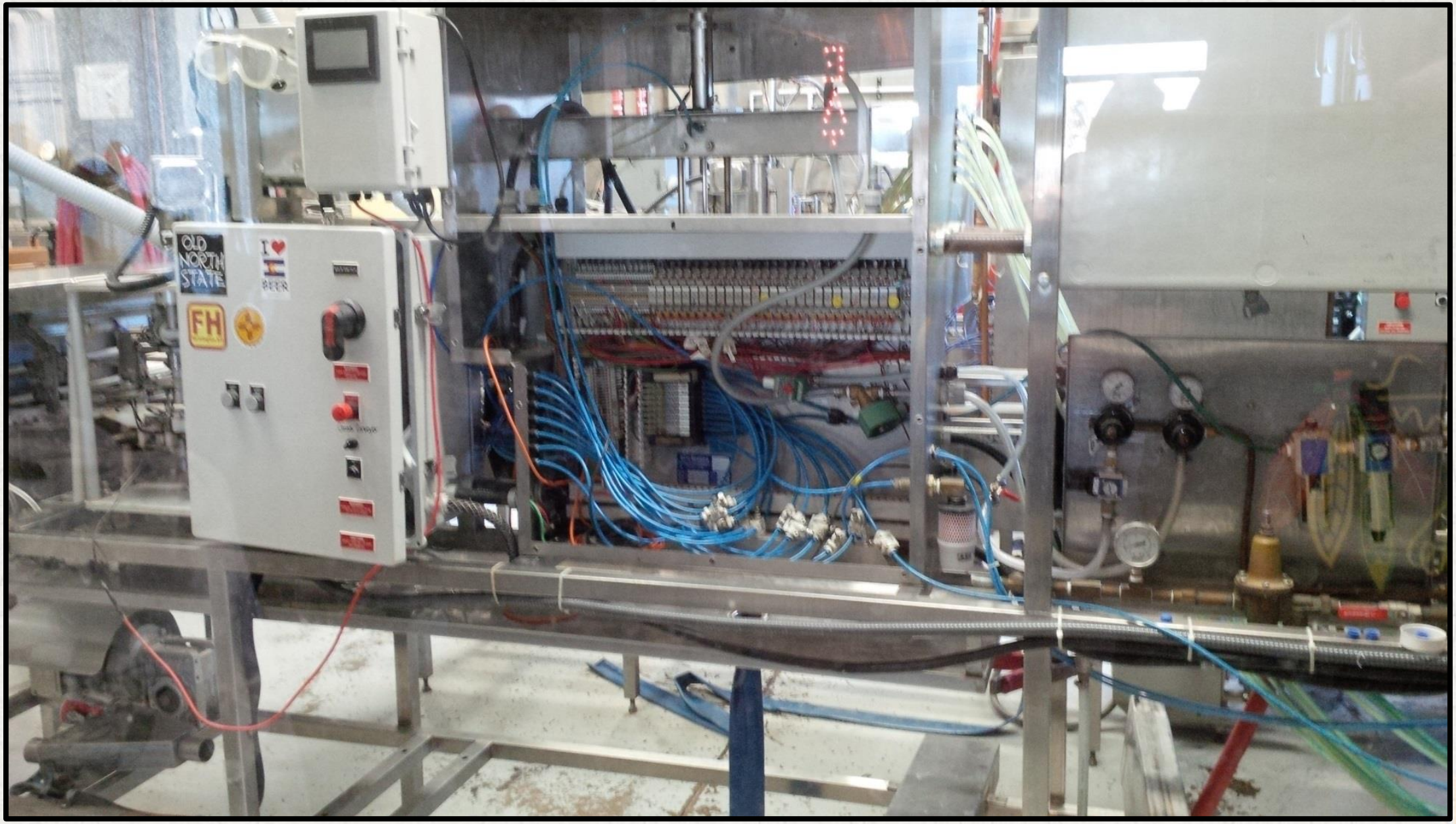
- Grist mill, conveyors
- Pumps, mixers
- Chillers
- Power tools
- Packaging lines
- Office/retail equipment
- Kitchen appliances

OUTCOMES

- Electric shock
- Electrocution
- Arc flash/blast
- Damage to equipment
- Building fire

CONTROLS

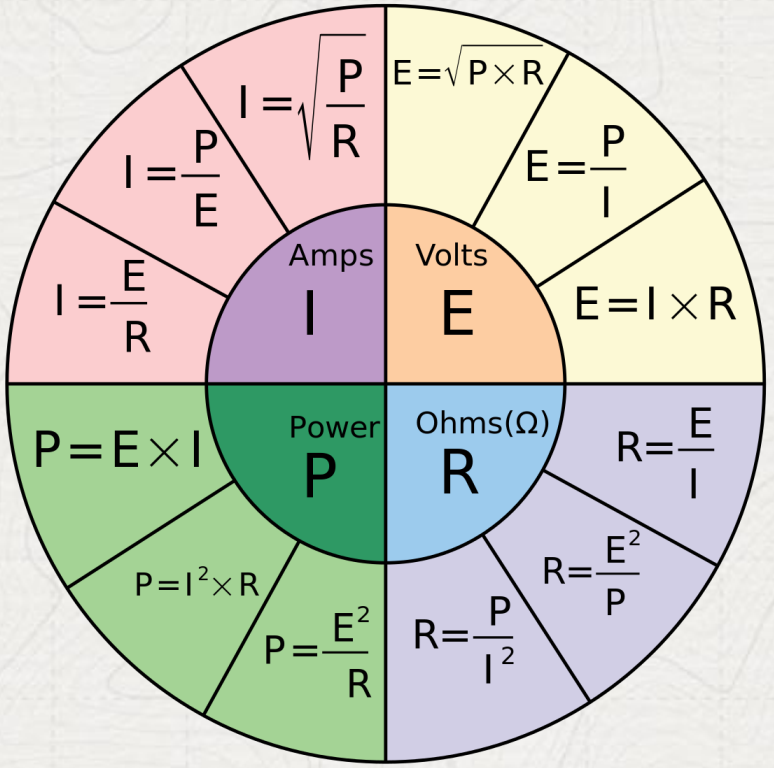
- No openings in boxes or covers
- Rated for amps required
- Switches, GFCIs, Disconnects, Grounds
- Equipment access in emergency
- No cords through doors, openings, walls…



OHM'S LAW

I = E/r

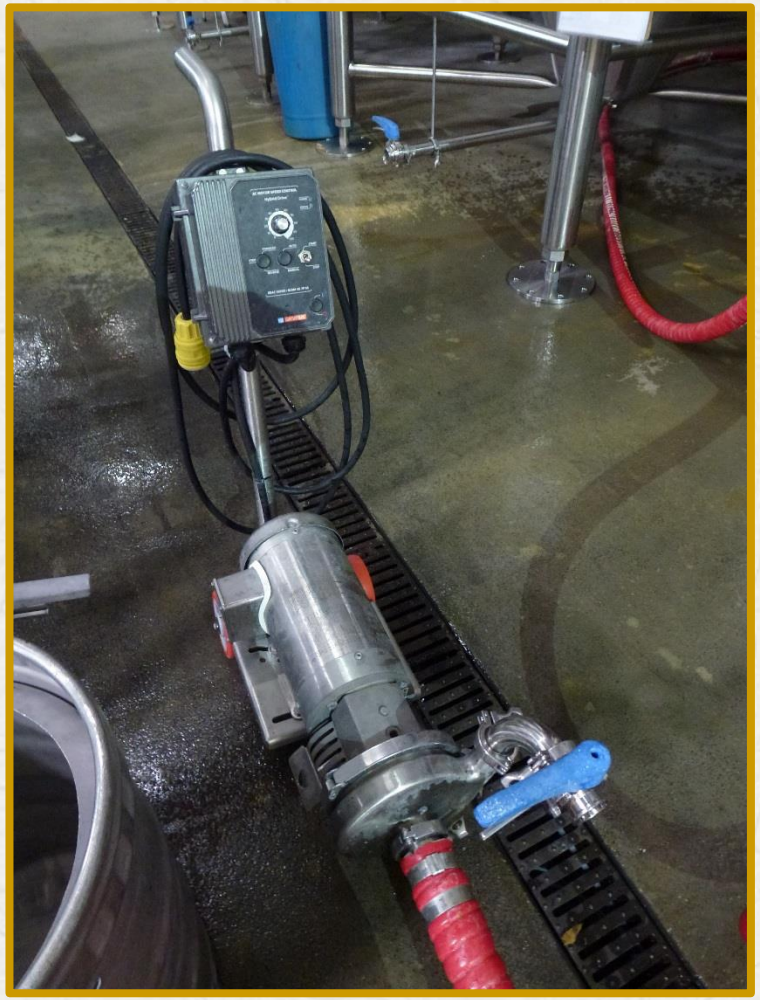
- I = current, is the flowing electricity
- E = volts, force that pushes
- r = resistance trying to hold it back

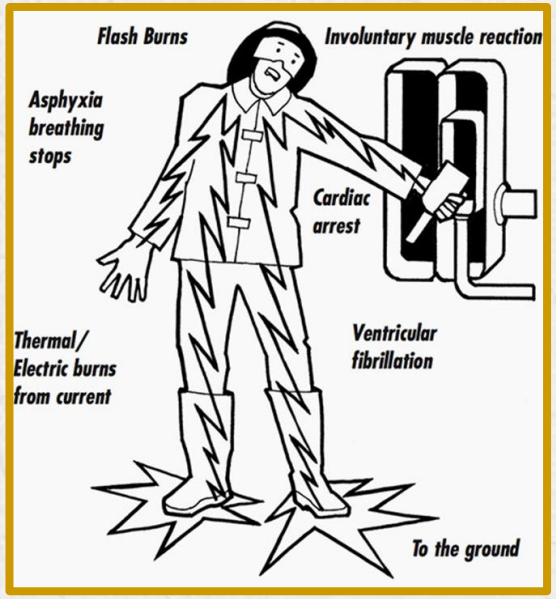


W = E•I

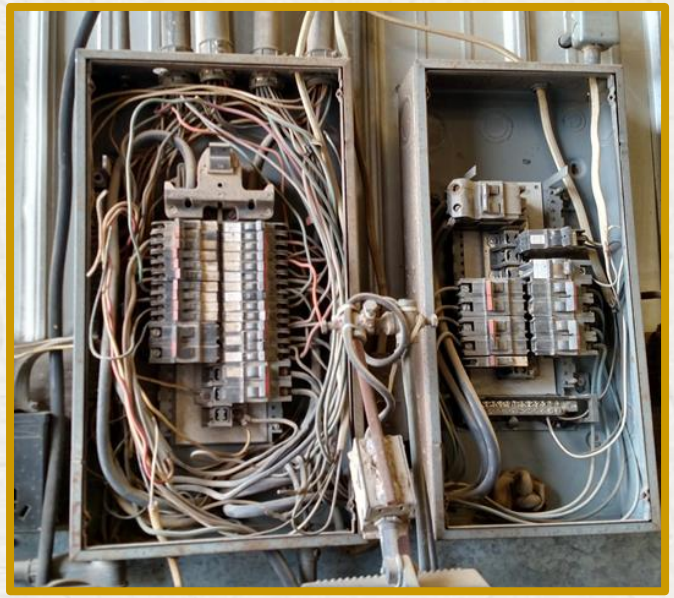
- W = watts, unit of power
- 745.7 W = 1 Hp

LOOK AT YOUR PUMP MOTOR:
HIGHER VOLTAGE USES LOWER AMPERAGE



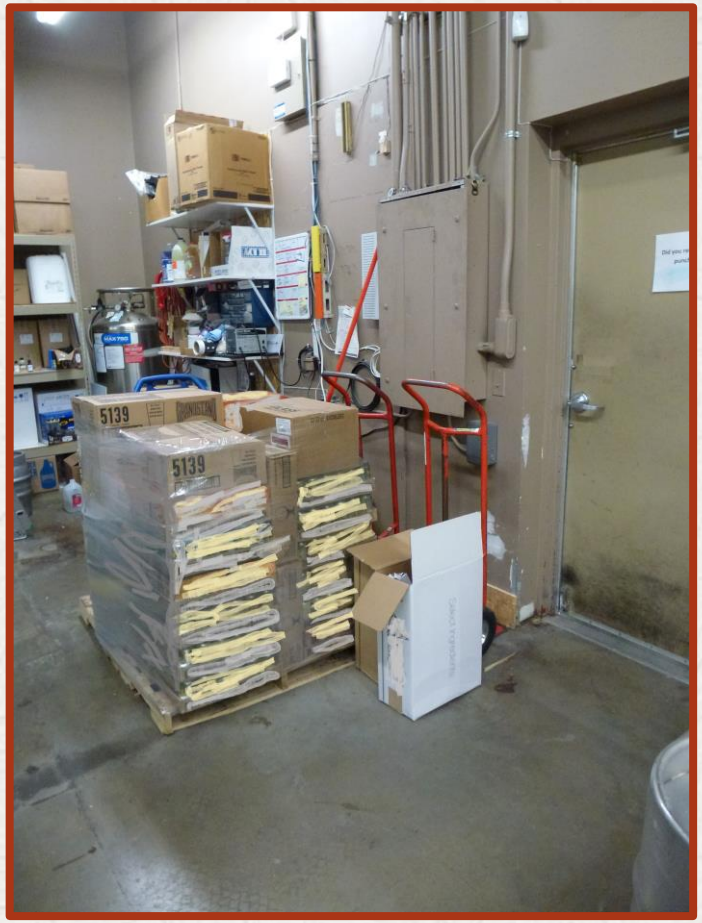


WHEN DO I FEEL A SHOCK?



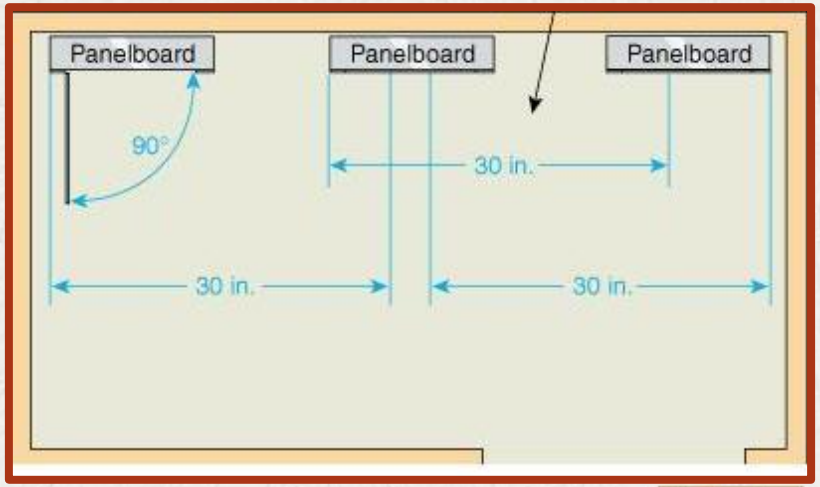
CURRENT	PHYSIOLOGICAL RESULT	FEELING OR LETHAL INCIDENCE
1 mA	Perception threshold	Tingle
2 – 10 mA	Sensation of shock	Maintain muscle control, not painful
5 mA		GFCI trips
10 – 20 mA	Paralysis threshold of arms	Cannot release hand grip, may be thrown clear
20 – 50 mA	Respiratory paralysis	Breathing stops, usually fatal
50 – 200 mA	Fibrillation threshold	Heart beat uncoordinated, usually fatal
>200 mA	Tissue burns	Non-fatal unless are vital organs

KEEP CLEAR ACCESS FOR AN EMERGENCY



RIGHT

WRONG



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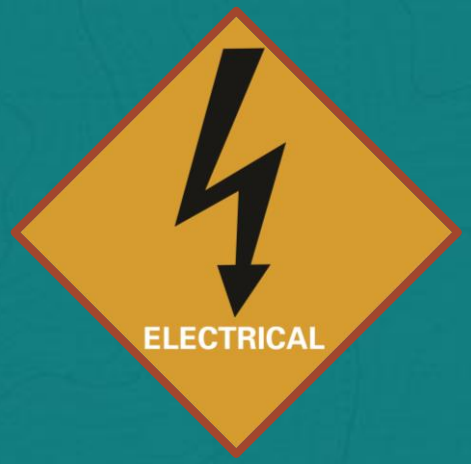
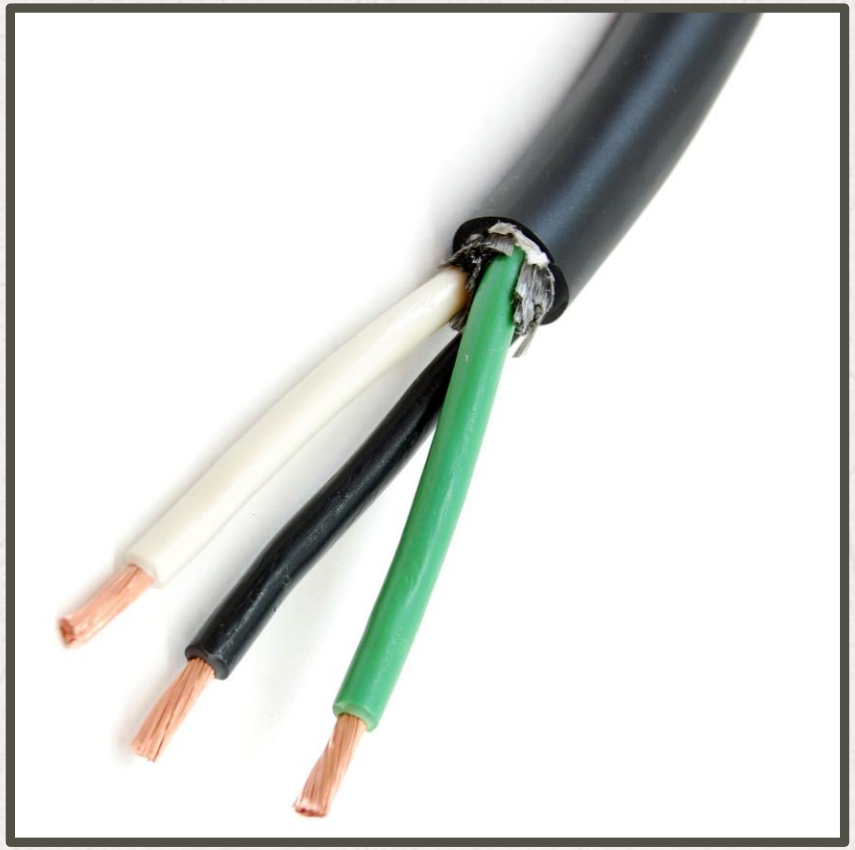
EXTENSION CORDS



SELECTION

- Protective jacket over insulated conductors
- Read instructions for use and amps.
- Select cords rated for your current
- Thick, round, big gauge, high amp cords are best



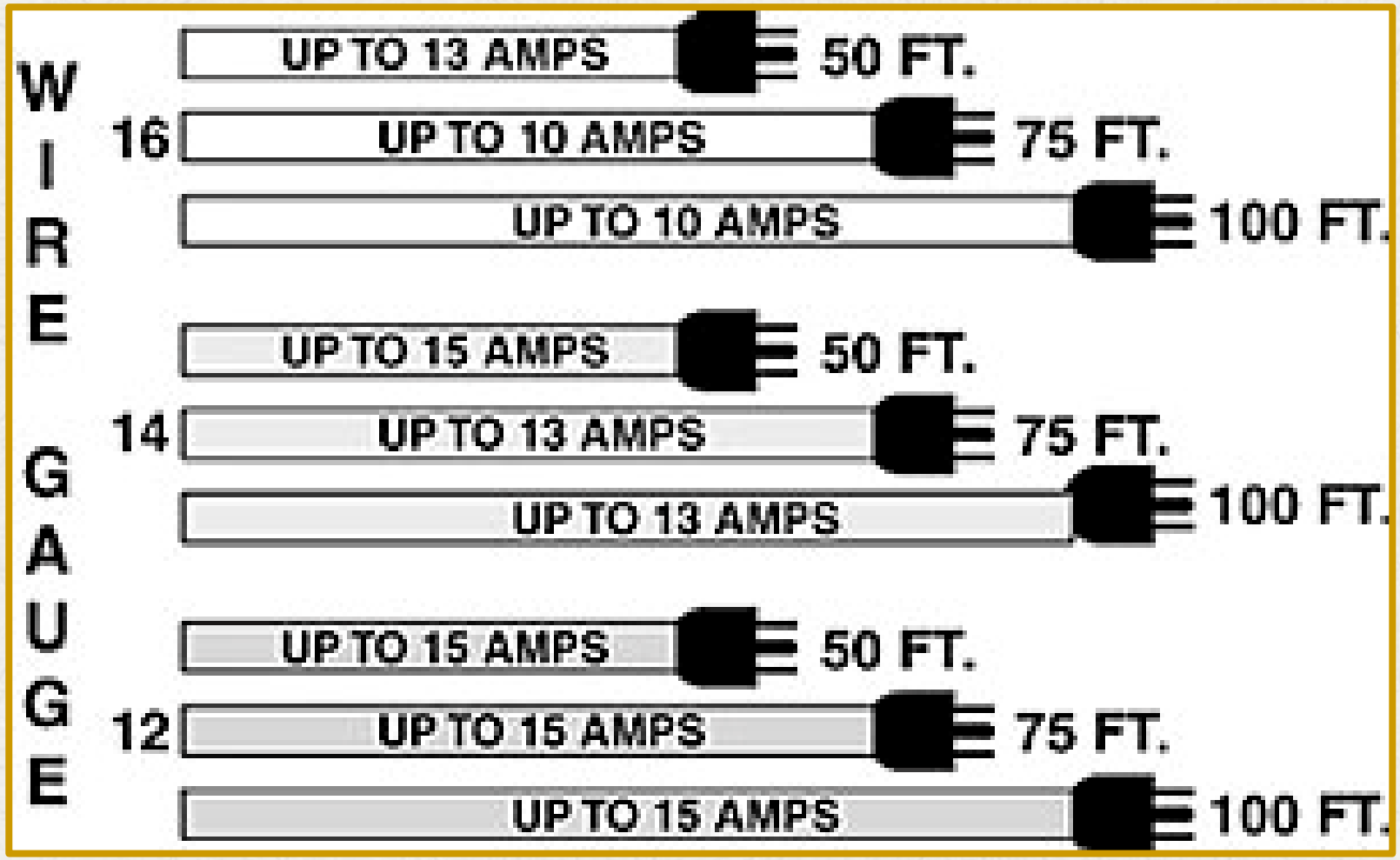
EXTENSION CORDS

THE LONGER THE CORD…

- …the higher its RESISTANCE
- …the lower its CURRENT rating

THE HEAVIER THE GAUGE…

- …the lower the GAUGE
- …the higher its CURRENT rating



EXTENSION CORDS

READ THE CORD!

- S – Flexible cord
- W – Outdoor use
- J – 300V insulation
- No J – 600V insulation
- P – Parallel wire construction, used in air conditioner cords and household extension cords

- T – Jacket is vinyl thermoplastic
- E – Jacket is thermoplastic elastomer rubber (TPE)
- O – Cord is oil-resistant

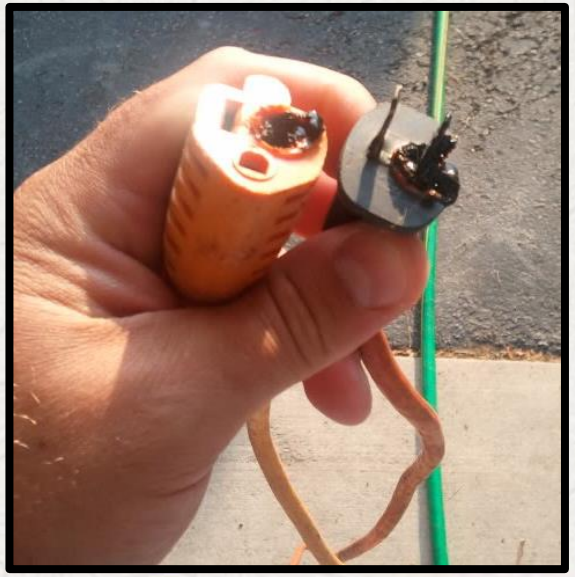
- Wire Gauge and Number of Conductors

  e.g. 18/3, 8/4

On this cord, SJTW indicates the jacket type and AWG 18/3 indicates the gauge rating.

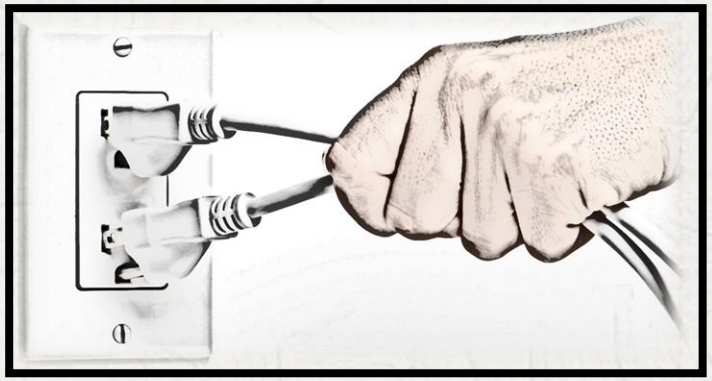
CORD CARE

- Outlet, cover plate get hot
- Plug ends gets hot at outlet box
- Both plugs get hot
- Entire cord gets hotter
- Transfer of electricity across a gap creates heat



LOVE YOUR CORD

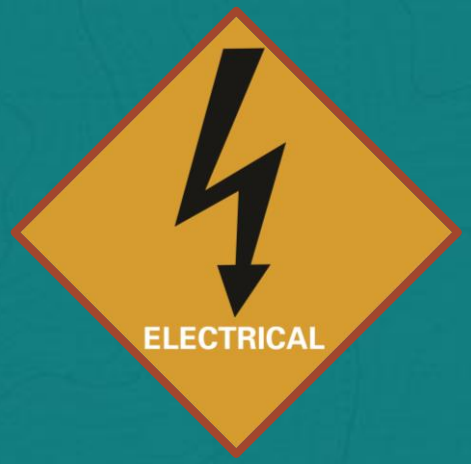
- Pull on the plug
- Unplug from outlet first, then tool
- Power arcs across the connection
- Avoid touching when wet
- Unplug it
- Cords are temporary; add more outlets

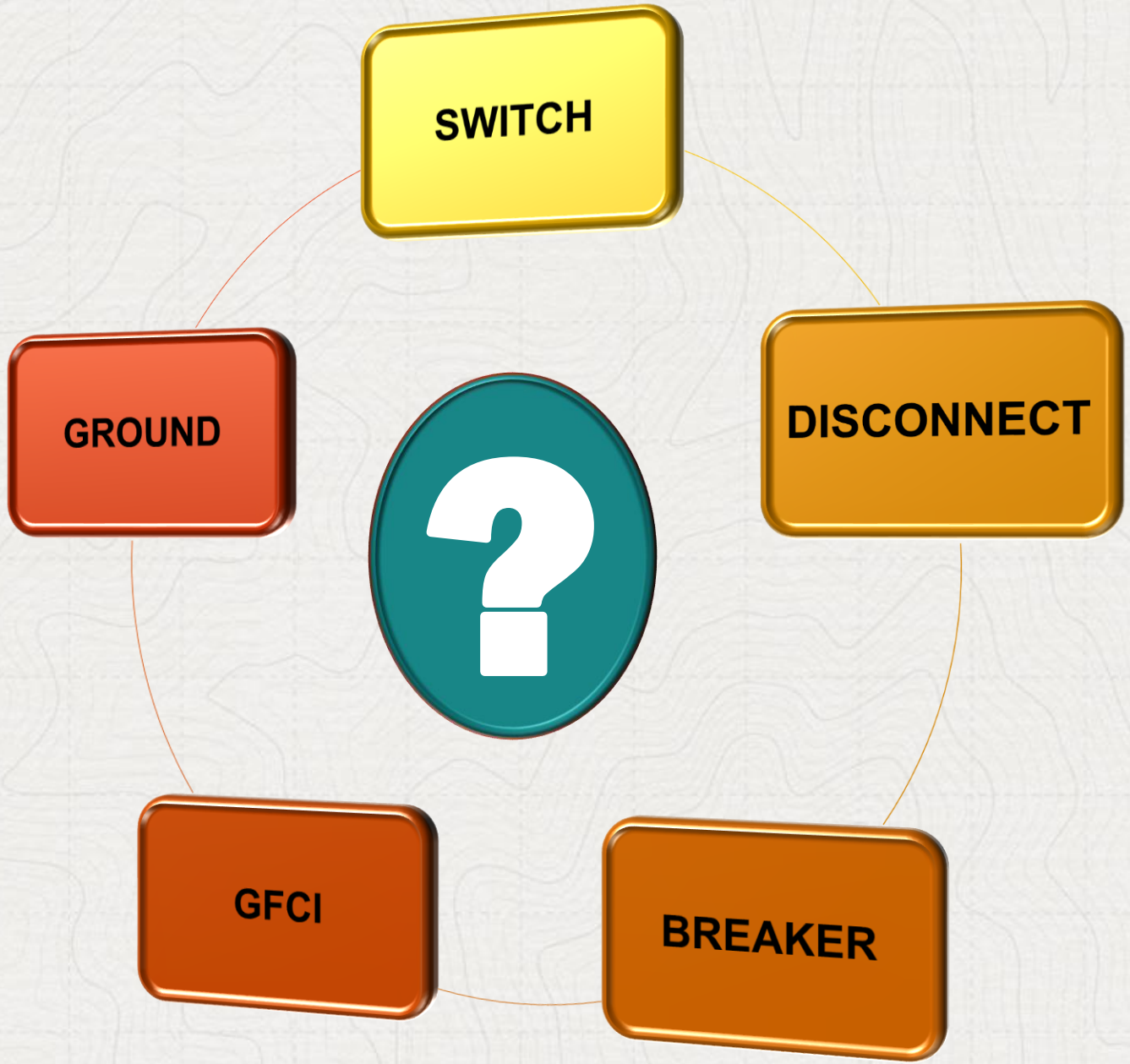


ROLLED CORDS

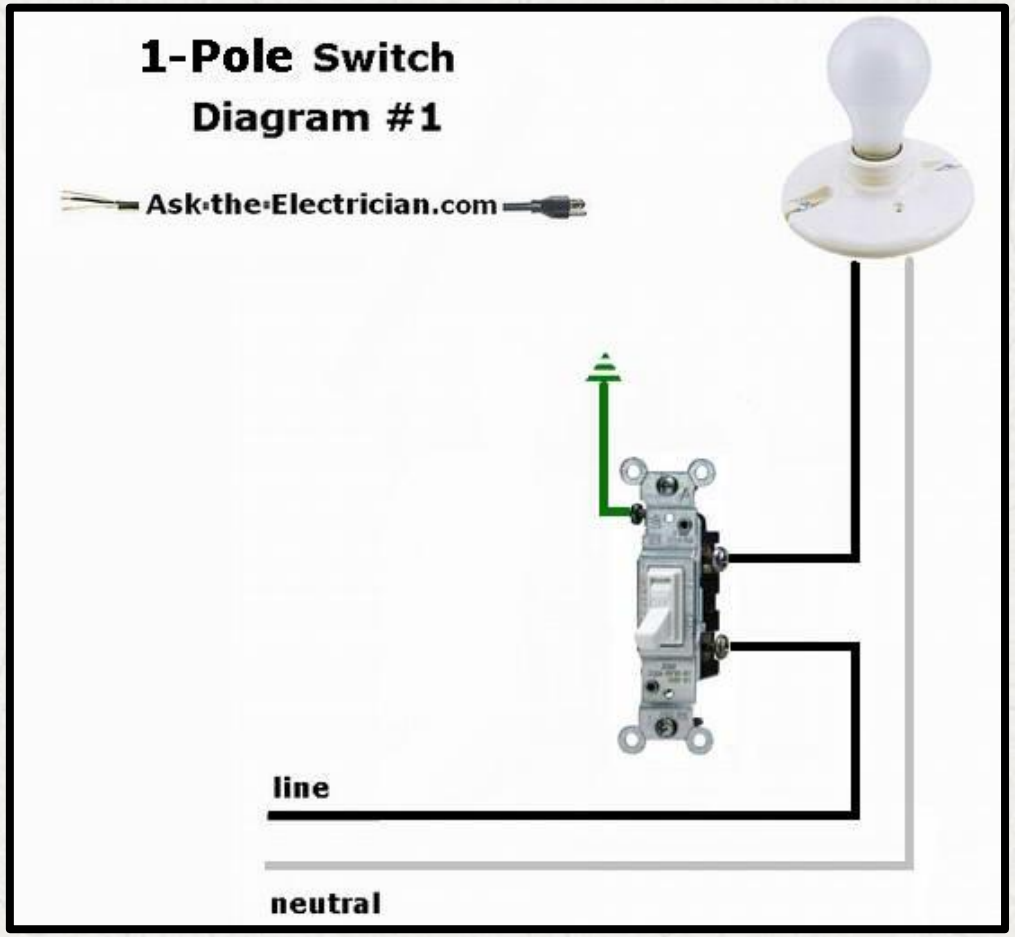
- Current heats cords
- Inductive coupling magnifies heat
- Stop using hot cord

GROUNDING AND CIRCUIT INTERRUPTORS

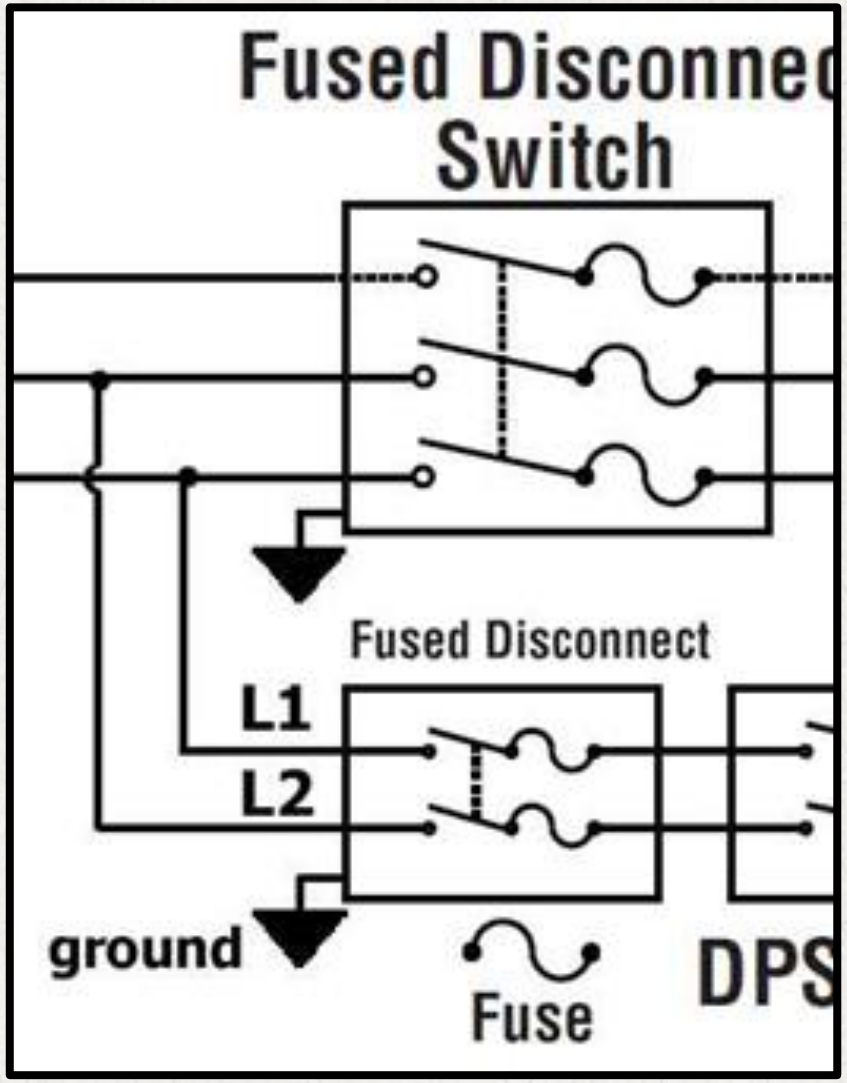




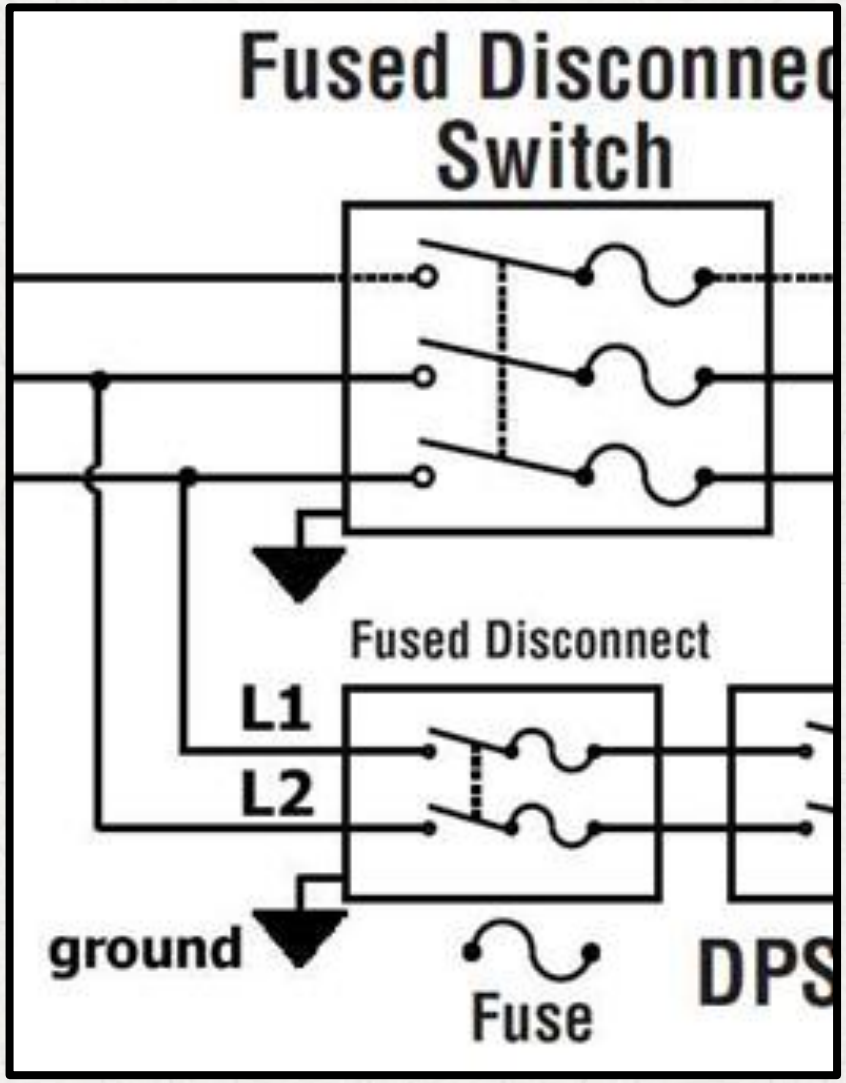
SWITCH VERSUS DISCONNECT



VS.



DISCONNECT VERSUS BREAKER



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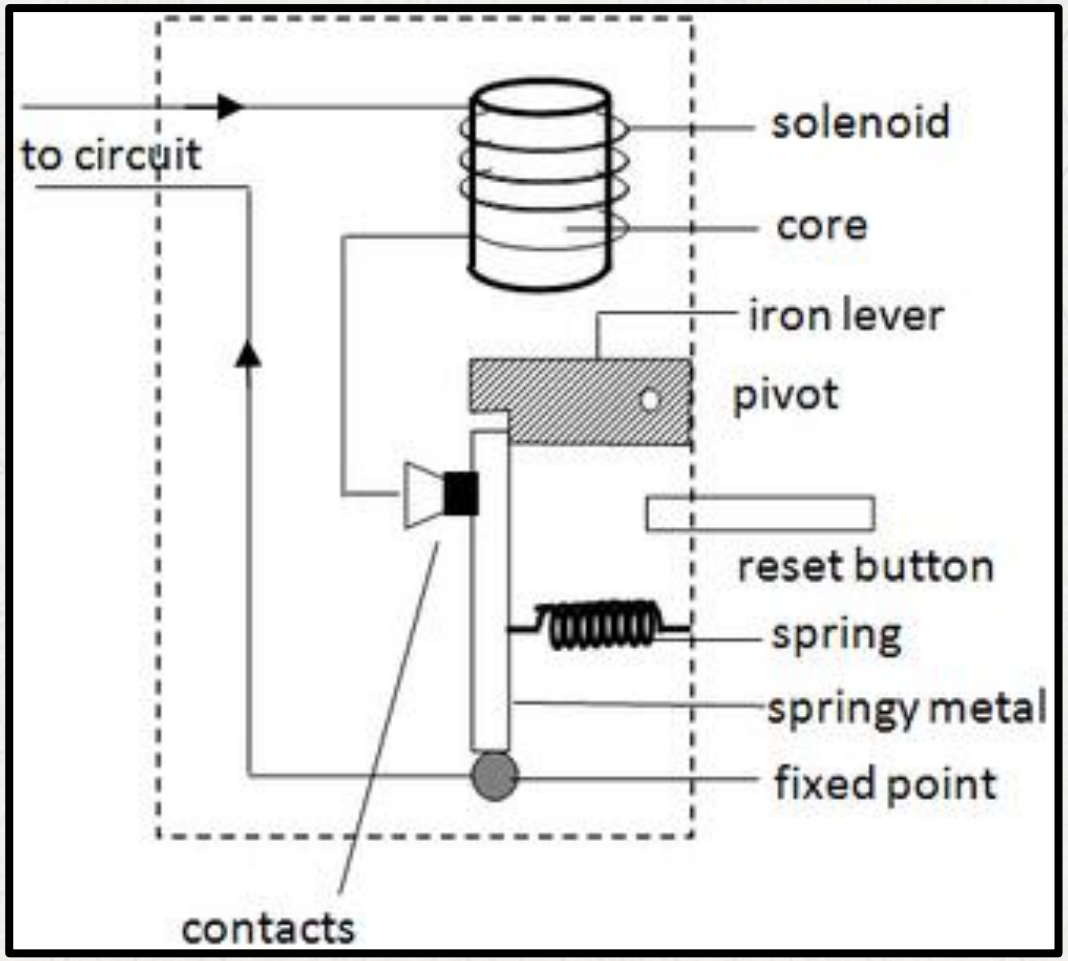
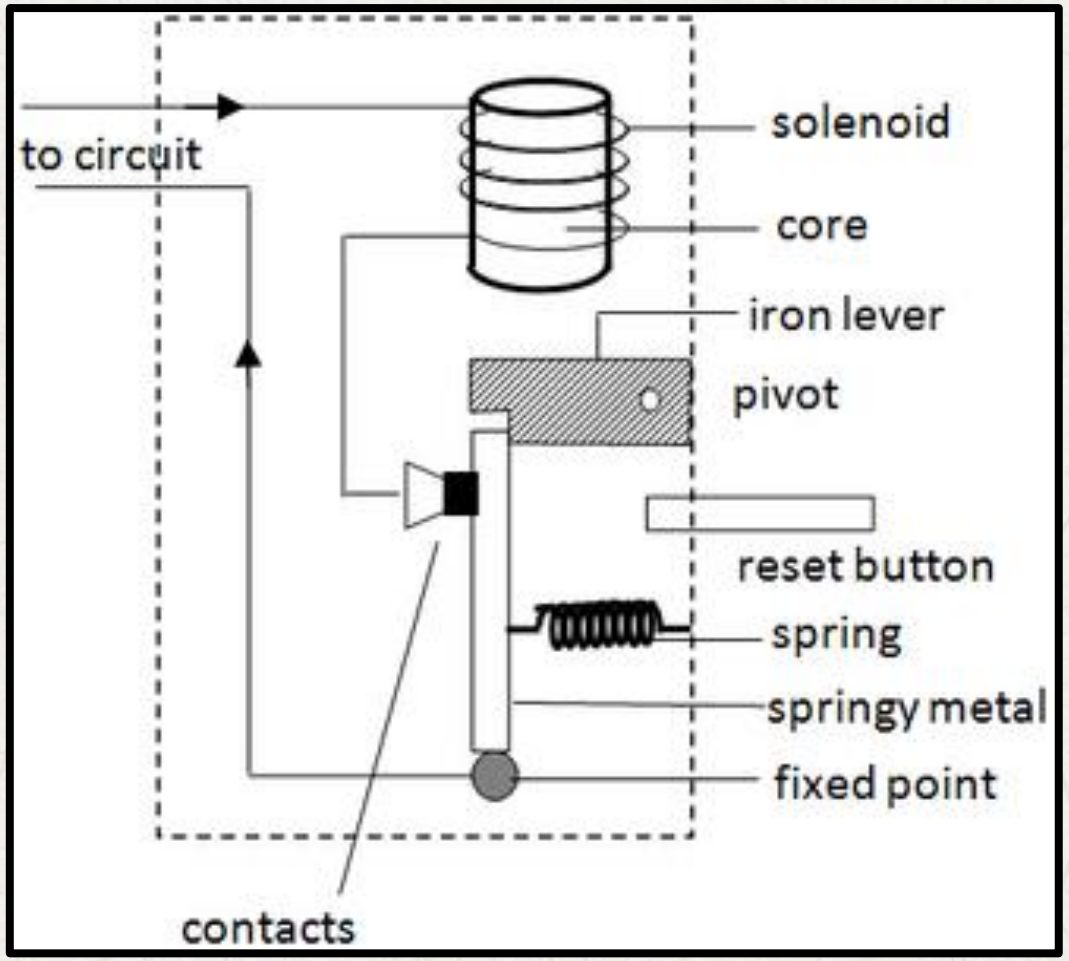


BREAKER VERSUS GFCI



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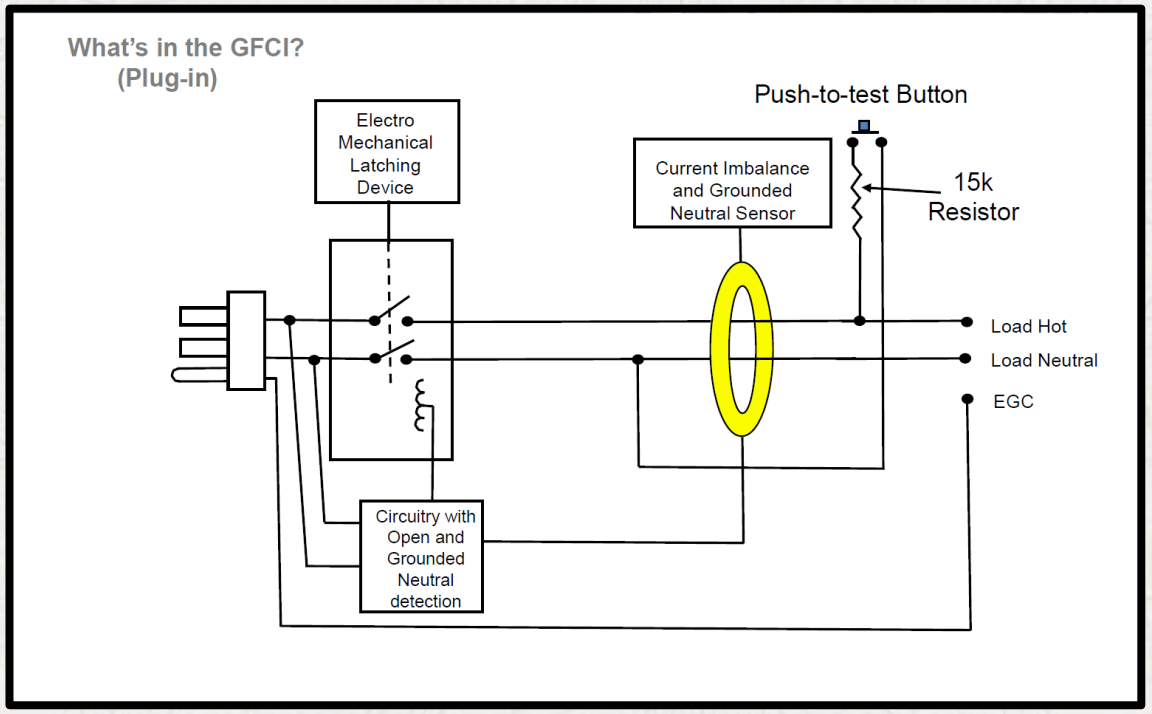
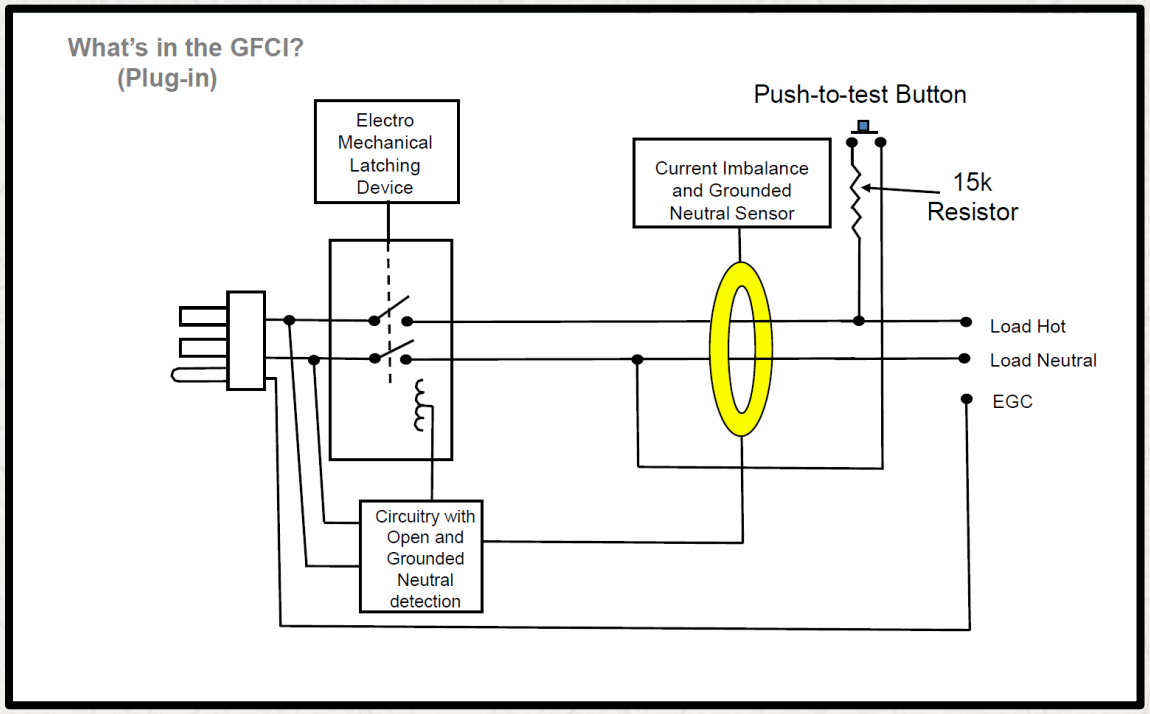


GFCI VERSUS GROUND WIRE



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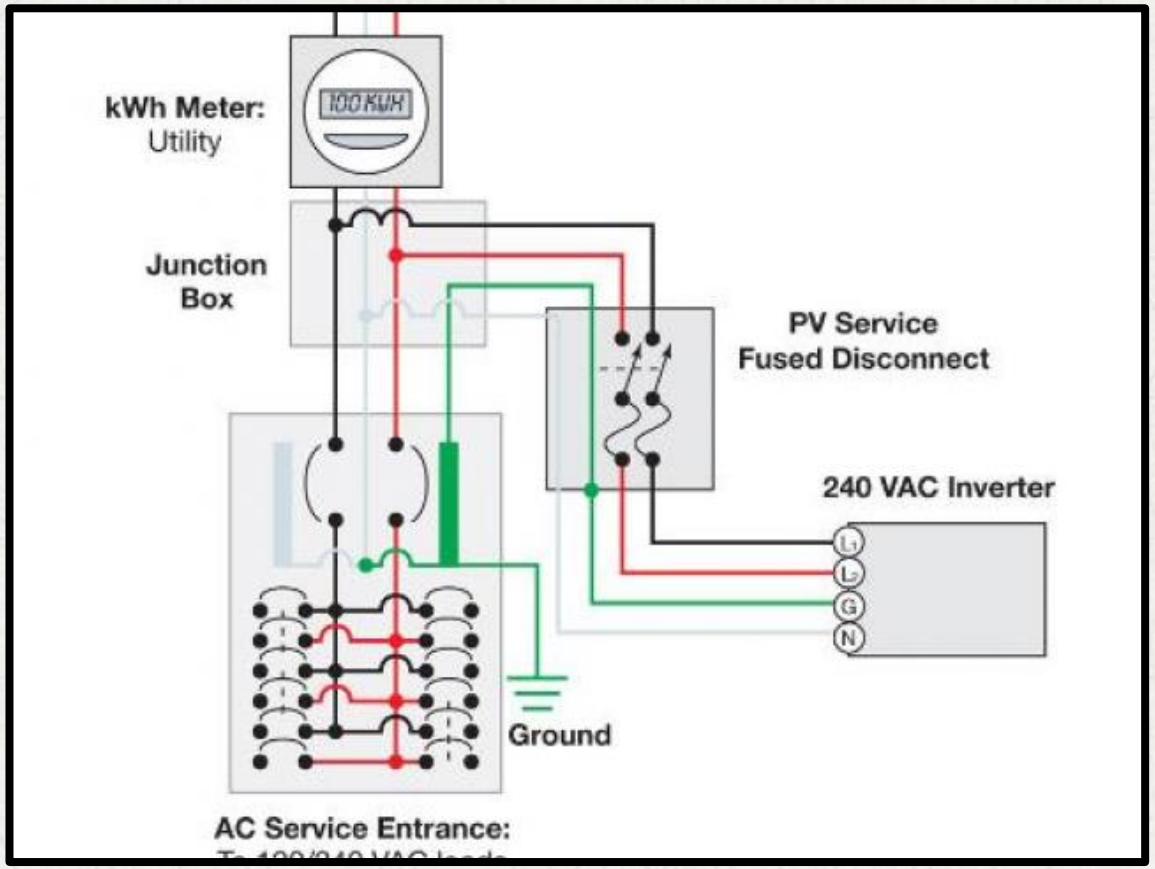


ELECTRICAL HAZARD CONTROLS

SWPs

- Squeegee floors
- Reduce water
- Close panels
- Clean dust out of panels
- Minimize extension cords
- Dust off outside of equipment

RESPECT "WASHDOWN"

- Motors are not water-tight
- Drain holes in bottom
- You can get shocked

SHUTOFFs

- Disconnect not switch
- "within sight of" equipment
- "easy to reach"
- Clearly indicates OFF
- OFF is always down

PRESSURE HAZARDS

PRESSURE HAZARDS

- Compressed Air
- Compressed Gases: CO_2, N_2, O_2
- Beer Under Gas or Hydrostatic Pressure
- Keg Cleaning
- Packaging Systems
- Draught Systems
- Kettle Pressure
- Pumped Fluids and Hot Water

BA BREWERS ASSOCIATION

PRESSURE HAZARD ASSESSMENT

TASKS

- Moving Beer
- Keg Cleaning
- Vessel CIP
- Using Compressed Air and Gases: CO_2, N_2, O_2
  - Oygenating
  - Carbonating
  - Packaging
- Wort Production

OUTCOMES

- Equipment Failure
  - Tank Vacuum Implosion
  - Tank Pressure Explosion
- Flying Objects
- Chemical Spray
- Asphyxiation
- Wort Burns

CONTROLS

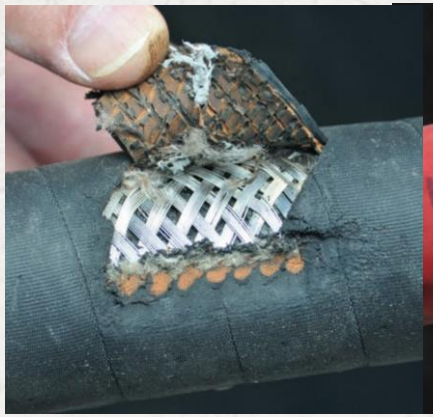
- Use gauges
- Primary & Secondary Regulators
- Cylinder Restraint
- Pressure / Vacuum Relief Valves
- Burst Disks
- Proper Fittings

PRESSURE HAZARDS

DON’T BE A HOSER!

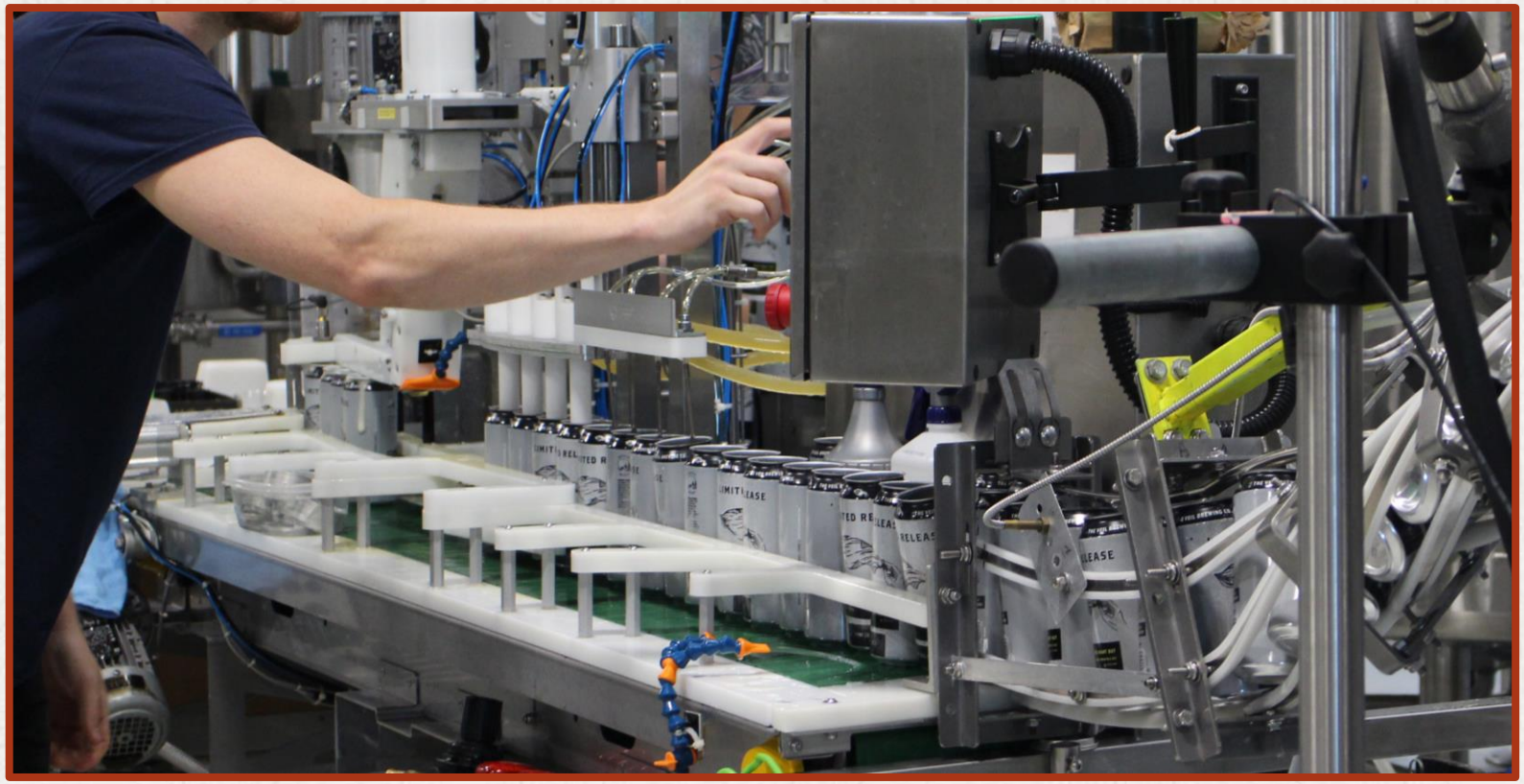
WAY TO GO!!!

NO NO NO!!!



MECHANICAL HAZARDS

PINCH, CUT, CRUSH AND ERGONOMIC HAZARDS



BA BREWERS ASSOCIATION

PINCH, CRUSH, CUT AND ERGONOMICS HAZARD ASSESSMENT

TASKS

- Grain Milling & Conveying
- Pumping, Mixing
- Material Handling
  - Grain bags, boxes, pallets
  - Lifting beer kegs, cartons
- Packaging Beer
- Taproom, Kitchen Activities

OUTCOMES

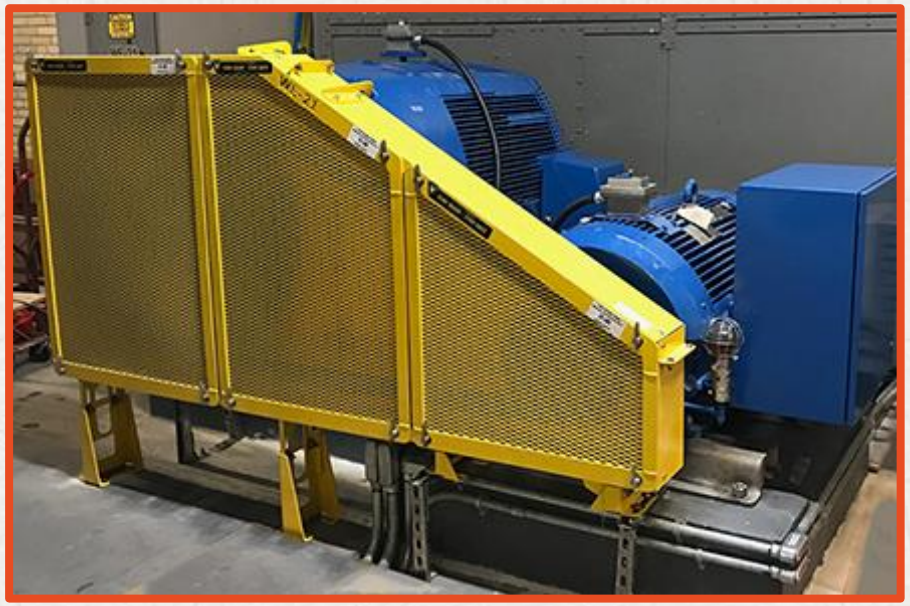
- Crushed, Amputated Parts
- Broken Bones
- Eye Injury
- Laceration, Infection
- Back, RMD
- Forklift – “caught between”
- Damage to equipment

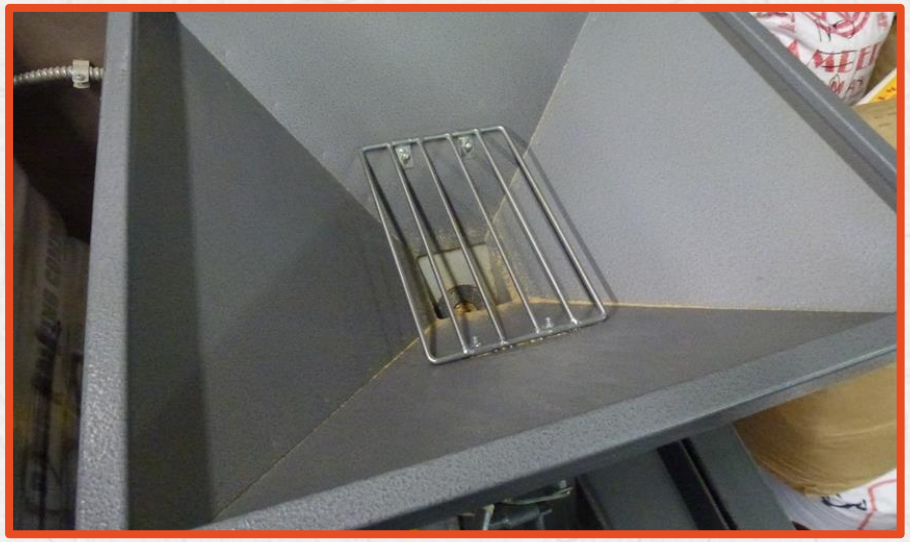
CONTROLS

- Use proper fittings, not hardware store fixes
- Machine guarding
- Hands out of moving equipment
- LO/TO
- Safe knife use
- PM schedules

MACHINE GUARDING

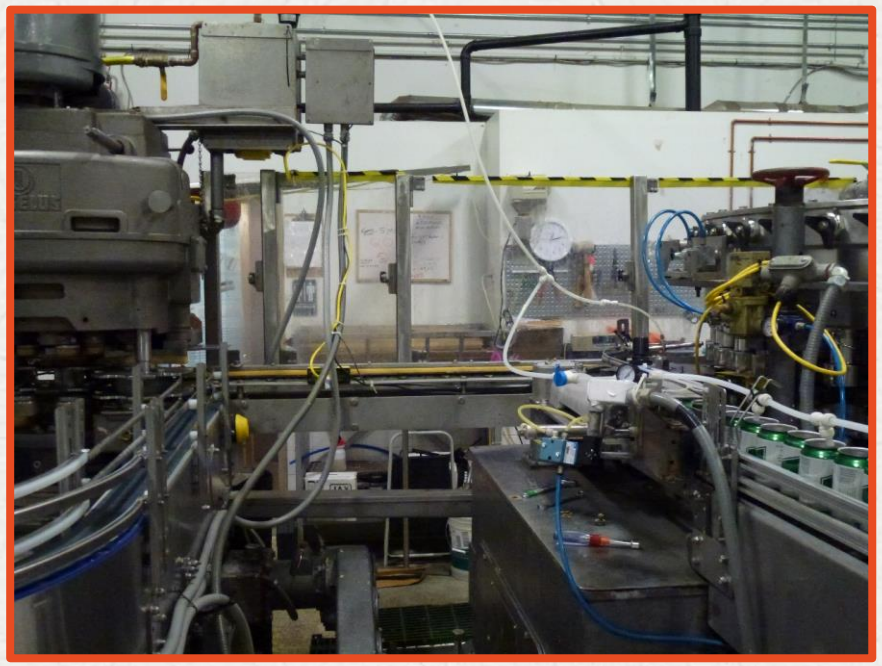
- How large can the openings be?
- If can touch, what bites?
- Emergency shutoff





MACHINE GUARDING ENGINEERING CONTROLS

- Machine guarding, safety windows
- Interlocks, process logic controls
- Good repair / with PM program
- Lockout/tagout
- Guards limit water travel
- Body protection
- Sound barrier



ERGONOMIC HAZARDS

MORE TO COME FROM ANDREW…

BA BREWERS ASSOCIATION

NOISE HAZARDS

NOISE SOURCES

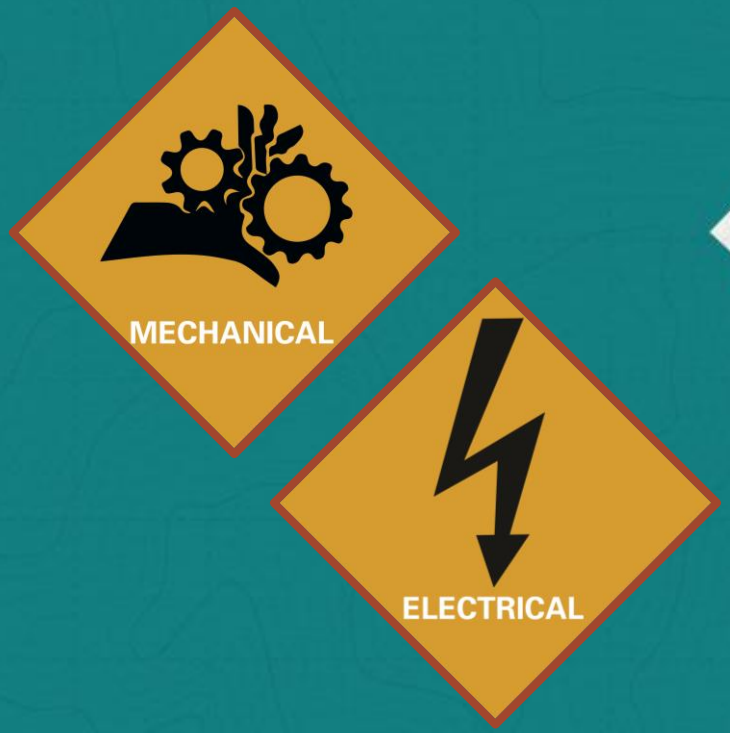
- Grist mills
- Pumps
- Centrifuges
- Packaging Lines
- Air Compressors
- Loud Music Systems
- Personal Music Systems

NOISE CONTROLS

- Isolate workers from noise
- Insulated rooms, walls
- Hearing protection
  - Voluntary
  - HPP
- Hearing rule of thumb

You need to be able to hear your brewing systems: mill, pumps, bearings, HLT/CLT, co-workers, etc.!

HAND AND POWER TOOL HAZARDS



Andrew Dagnan

Environmental and Safety Manager

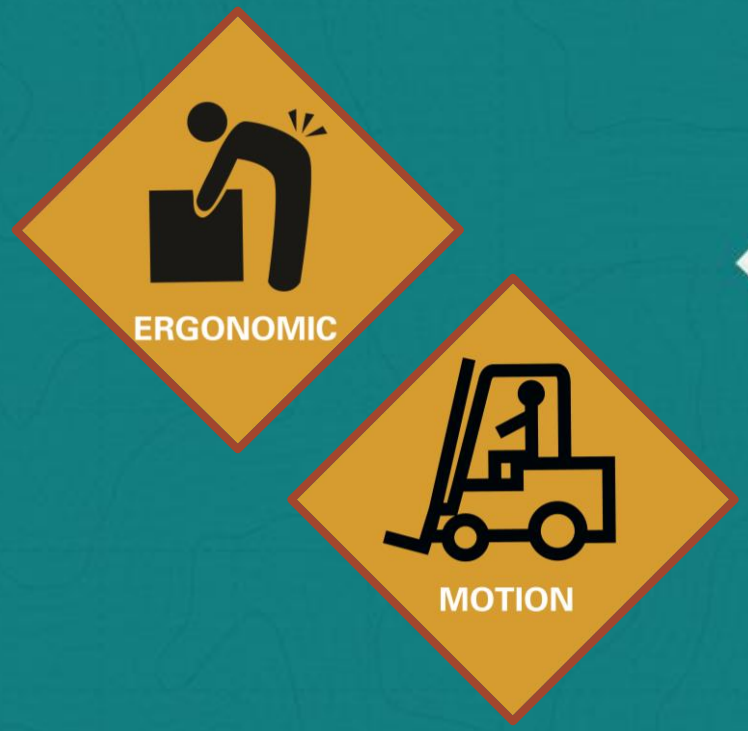
Breckenridge Brewery

Littleton, Colorado

MATERIAL HANDLING

MANUAL AND MECHANIZED
MOVEMENT OF MATERIALS

MATERIAL HANDLING



HAZARDS

- Lifting/moving heavy objects
- Bending, twisting, turning
- Falling objects
- Lifting, pushing, pulling
- Improperly stacked materials
- Struck-by or caught-in/-between hazards
- Falls, slips, trips, or loss of balance
- Repetitive motion
- Overexertion

INJURIES

- Sprains, strains, tears
- Soreness and pain
- Bruises and contusions
- Cuts, lacerations, punctures, crushing, and amputations

MATERIAL LIFTING AND ERGONOMICS

MANUAL LIFTING

How many times have you seen this?

160 lb.!!!

BA BREWERS ASSOCIATION

ERGONOMIC HAZARDS STUDY – AT A COLORADO BREWERY

CONCLUSIONS

- Employees at increased risk for upper extremity (shoulder and wrist) Work-related Musculoskeletal Disorders (WMSDs)
- Employees exposed to combination of ergonomic risk factors
- Survey indicated that 50% of employees felt safety training received was not adequate and safety procedures in place don't work

BEFORE YOU LIFT/MOVE – THINK

- How heavy is the object?
- How can the object be lifted?
- Can you get help from a coworker?
- What is the proper way to lift the object(s)?
- Can you get help from equipment?
- Dollie, handtruck, pallet jack, forklift, hoist

If it's just too heavy, awkward, or large… Don't lift it.

TYPICAL HEAVY OBJECTS

- Case of Beer – 30 lb.+
- Hop Box – 44 lb.
- Malt Bag – 50/55 lb.
- Keg (1/6 bbl) – 55 lb.
- Keg (1/2 bbl) – 160 lb.
- Full Barrel – 500 lb.+
- Brewing Hoses – can be very heavy
- Various Others – packaging change-over parts, waste or recycling containers

LIFTING HAZARD CONTROLS

- **Reduce / Eliminate lifts**
  - Automate processes
  - Keg Vacuum Lift or Robot
  - Hoists / lifts
  - Bulk (silos, super sacks)
- **Two-person lifts**
- **Training on proper lifting**
- **Redesign tools / areas within appropriate heights**
  - Above knees, below shoulders
- **Rotate employees**
- **Encourage micro breaks**

MATERIAL HANDLING EQUIPMENT

ADVANTAGES OVER MANUAL MATERIAL HANDLING

- **Lower Cost of Labor**
  - Higher Efficiency
  - Capital Expense is Greater
- **Mechanized Material Handling**
  - Adds its own new hazards
  - Extra Certification / Training
- **Other Advantages**
  - Fewer Injuries
  - Lower Workers Comp Premium
  - Increased Productivity

“ROLL OUT THE BARREL” – EQUIPMENT EXAMPLES

“KEG PARTY!” – EQUIPMENT EXAMPLES

STILL MORE EQUIPMENT EXAMPLES

MATERIAL HANDLER SAFETY BASICS

- Check capacity plate – Never overload
- Protective footwear
- Inspect before use
  - Look for cracks or other defects
  - Ensure wheels are in good condition
- Check floor for ruts, bumps, imperfections
- If view is obstructed, have a spotter assist
- Not for human transportation
- When going down an incline, push, don't pull
- Hand Truck – Place load over axle – the operator should only balance and push

CRANES AND HOISTING

- **Operated only by thoroughly trained and qualified workers**
- **Before operation know**
  - Load & counterbalance wt.
  - Capacity of the crane
  - Effective rigging methods
  - Center of gravity of crane plus load
  - When the load is safe to lift
- **Use accepted hand signals and verbal cues**
- **Non-essential people out of the way**

POWERED INDUSTRIAL TRUCKS (PITs)

- **PIT**
  - Mobile
  - Power-propelled truck
  - Can carry, push, pull, lift, stack materials
- **Includes**
  - Forklifts
  - Powered Pallet Jacks
  - Powered Stackers

P.I.T. “CRASH COURSE” – NO, DON’T CRASH!

MUST DO

- **Written Program**
- **Training Documentation**
- **Inspections**
  - Daily
  - Shiftly
- **Packaging Beer**

YES, DO

- **Seat Belt, Horn, Lights, Backup Alarm, Safety Glasses**
- **Loads within Capacity, Low and Centered**
- **Forks**
  - <6” operating
  - On the floor when parked

SWPs

- **Hands inside the Cage**
- **Travel at Appropriate Speeds**
- **Anticipate Pedestrians**
  - Make eye contact
  - No mirrored eyewear
  - Use traffic mirrors
- **In and Out Carefully**
- **Replace Pallets**

P.I.T. “CRASH COURSE” – NO, DON’T CRASH!

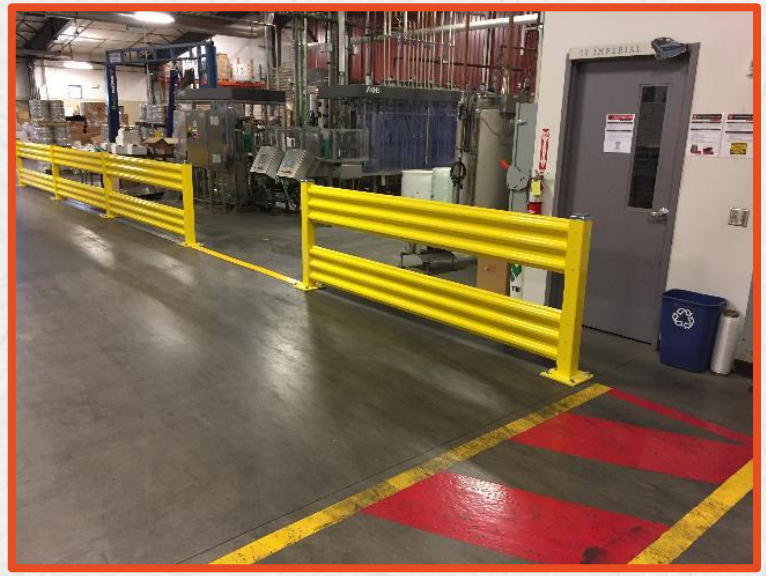
NO! NO!

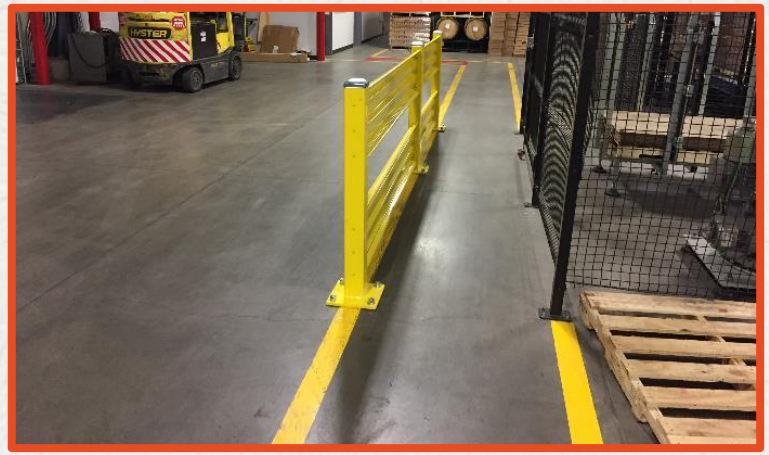
- Riders
- Impaired Operators
- Exceeding load or tilt
- Trying to Catch a Falling Load
  - Kegs
  - Barrels
  - Supersacks

P.I.T. “CRASH COURSE” – NO, DON’T CRASH!

SEPARATE

- **PITs from Pedestrians**
- **Indicate On**
  - Floors
  - Wall Signs
  - Barricades
- **Protect With**
  - Bollards
  - Dock Boards
  - Wheel Chocks





TRAINING REQUIREMENTS

REQUIRED TRAINING

- **PITs**
  - Before Use
  - Every 3 years
  - Re-training in certain cases
- **CRAINS/HOISTS**
  - Before First Use
  - Annual Refresher

RECOMMENDED TRAINING

- **GENL MATL HANDLING**
  - How to Recognize / Avoid Material Handling Hazards
- **HAND TRUCKS, PALLET JACKS**
  - Before Use
- **BACK SAFETY**

Another Great Presentation This Week

Brewing Ergonomics

Thursday, 1:00-2:00, Rm 505-507

Presenter: Steve Finnie
Brewer and Physical Therapy PhD

Chris Bogdanoff

Head Brewer

Heroes Restaurant and Brewery

Anaheim, California

CHEMICAL HAZARDS

SAFETY DATA SHEETS AND PERSONAL PROTECTIVE EQUIPMENT

CHEMICAL USAGE HAZARD ANALYSIS

TASKS

- Routine cleaning and sanitizing
- SS passivation
- Draught line cleaning
- Lab assays
- Maintenance projects

HAZARDS

- Skin, eye damage
- Respiratory distress
- Damage to brewery equip.
- Beer contamination
- Slippery surfaces

CONTROLS

- Substitution and Elimination
- Good housekeeping
- SWP – caution
- Maintaining SDSs, labels, signs, and placards
- Proper PPE use, selection, inspection, replacement

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
- Lab Reagents

6

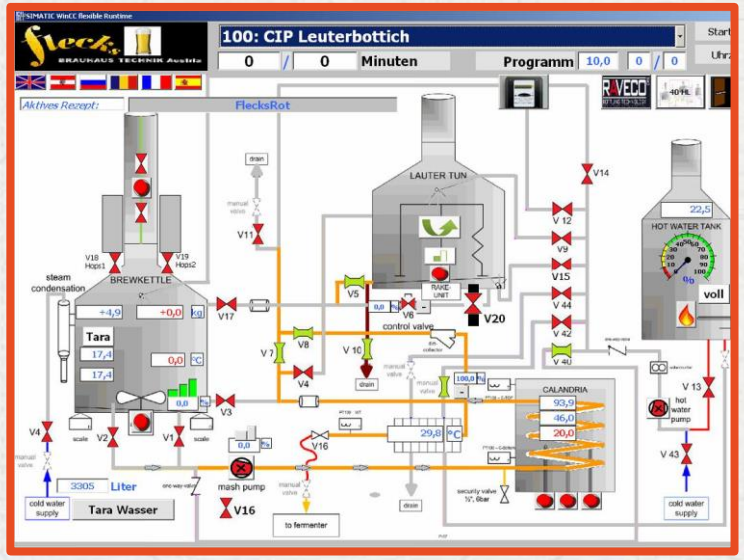
FACILITIES CHEMICALS

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

TOTAL MINDSET FOR PREVENTION AND PROTECTION AROUND CHEMICALS

1 SWP

2 EC



3 AC

4 PPE

BREWERS ASSOCIATION

SAFE WORK PRACTICES – ATTENTIONING THE HAZARDS

HOUSEKEEPING

- Keep Labels Visible
- Keep Clear Pathways
- Put Away Equipment

WALKING, WORKING AND EXITING

- Avoid Spills
- Rehearse Emergency Procedures

HYGIENE

- Wash PPE and Hands After Chemical Use

ENGINEERING CONTROLS FOR BREWERY CHEMICALS

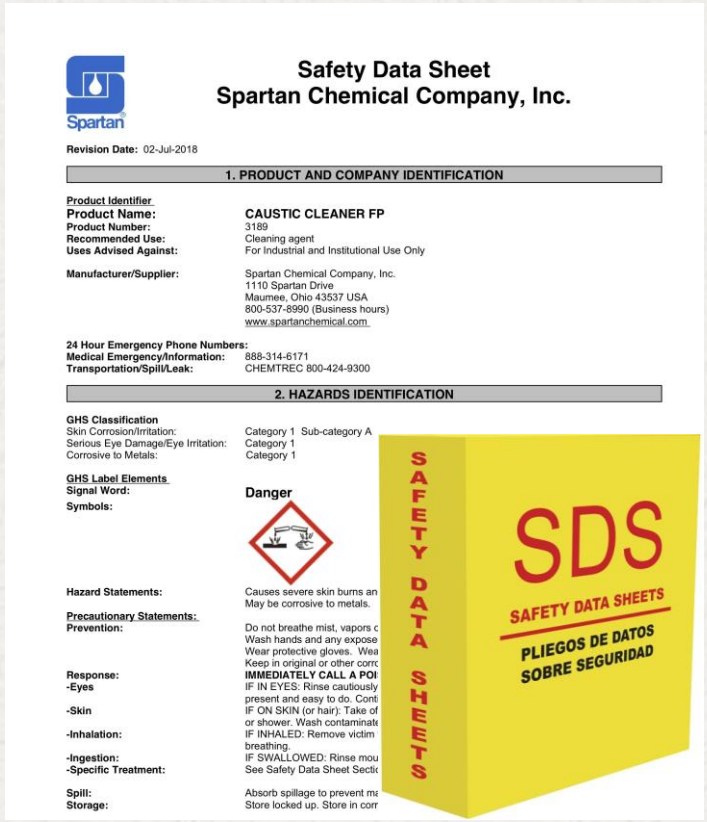
Secondary Containment

Chemically Compatible Equipment

Ventilation and Monitoring

ADMINISTRATIVE CONTROLS FOR BREWERY CHEMICALS

SDS



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

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: Danger
Symbols:

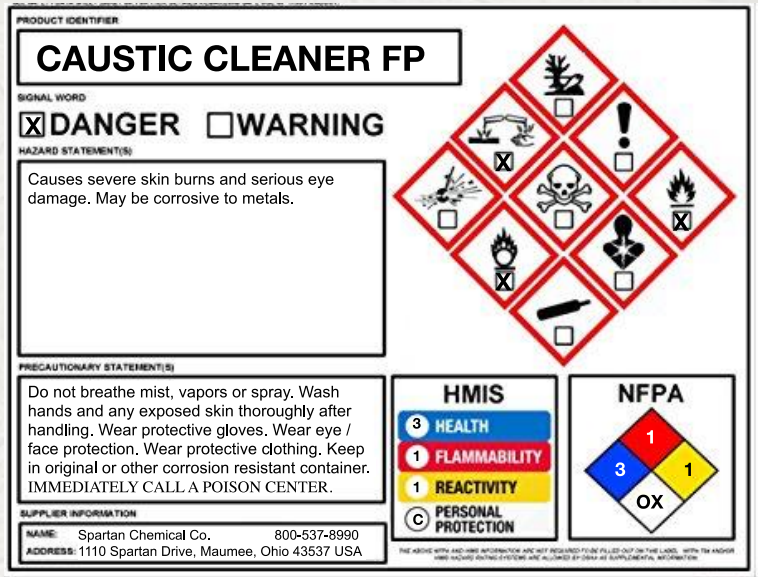
Hazard Statements: Causes severe skin burns an
May be corrosive to metals.

Precautionary Statements:
Prevention: Do not breathe mist, vapors c
Wash hands and any expose
Wear protective gloves. Wea
Keep in original or other corr

Response: IMMEDIATELY CALL A POI
-Eyes IF IN EYES: Rinse cautiously
present and easy to do. Cont
-Skin IF ON SKIN (or hair): Take of
or shower. Wash contaminat
-Inhalation: IF INHALED: Remove victim
breathing.
-Ingestion: IF SWALLOWED: Rinse mou
-Specific Treatment: See Safety Data Sheet Secti

Spill: Absorb spillage to prevent ma
Storage: Store locked up. Store in corr

LABEL



PRODUCT IDENTIFIER
CAUSTIC CLEANER FP

SIGNAL WORD
☒ DANGER ☐ WARNING

HAZARD STATEMENT(S)
Causes severe skin burns and serious eye damage. May be corrosive to metals.

PRECAUTIONARY STATEMENT(S)
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

CAUTION

Corrosive material
Avoid contact with eyes and skin

CAUTION

WEAR GOGGLES, FACE SHIELD, RUBBER GLOVES AND APRON WHEN HANDLING ACID OR CAUSTIC

PLACARDS

3 1 OX 1

OXIDIZER 5.1

CORROSIVE 8

Safety Data Sheet
Spartan Chemical Company, Inc.

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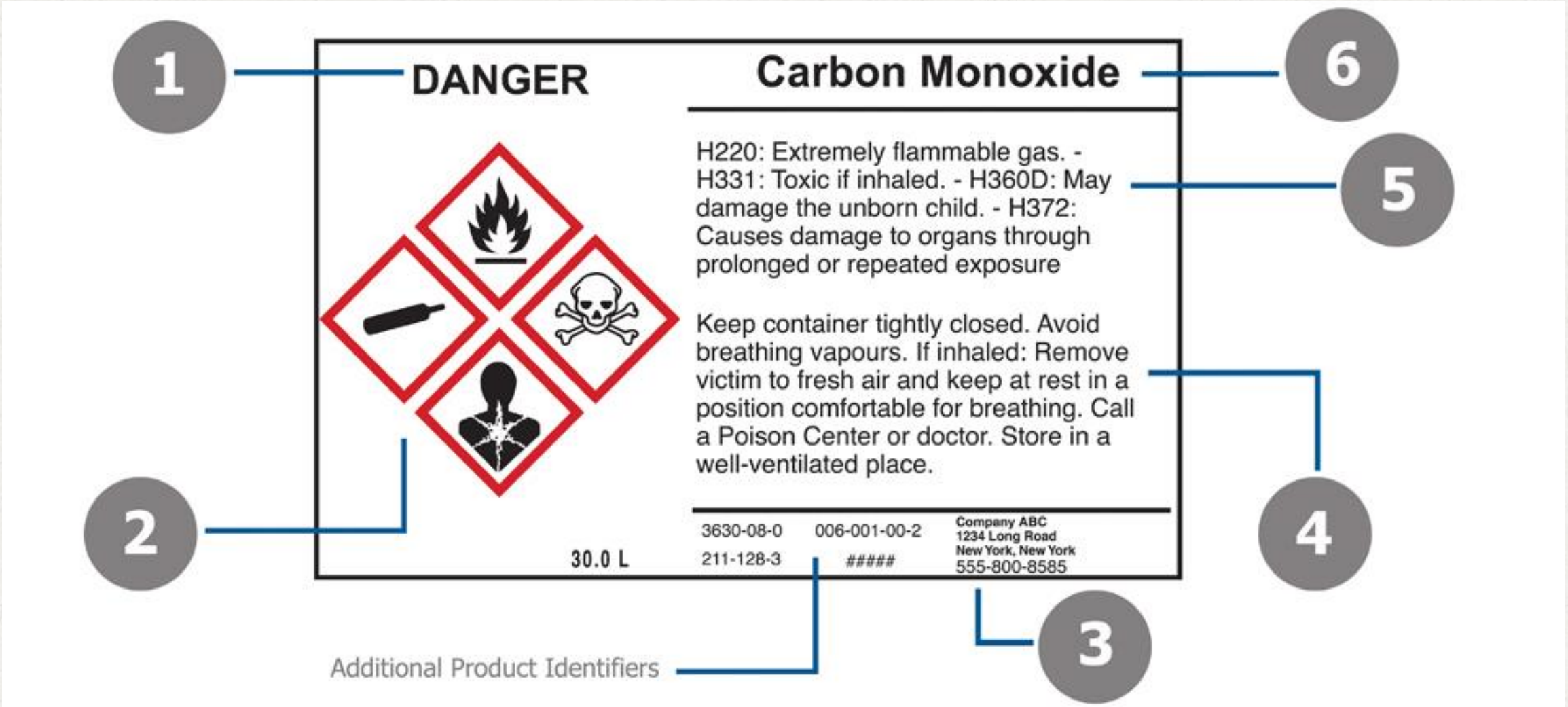
Skin Corrosion/Irritation: Category 1 Sub-category A
Serious Eye Damage/Eye Irritation: Category 1
Corrosive to Metals: Category 1

GHS Label Elements
Signal Word: **Danger**
Symbols:

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


1
DANGER
Carbon Monoxide
6
H220: Extremely flammable gas. - H331: Toxic if inhaled. - H360D: May damage the unborn child. - H372: Causes damage to organs through prolonged or repeated exposure
5
Keep container tightly closed. Avoid breathing vapours. If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a Poison Center or doctor. Store in a well-ventilated place.
2
4
3630-08-0
211-128-3
006-001-00-2
#####
30.0 L
Company ABC
1234 Long Road
New York, New York
555-800-8585
3
Additional Product Identifiers

CAUTION

Minor to Moderate Injury Potential

Black on Yellow

WARNING

Death or Serious Injury is Possible

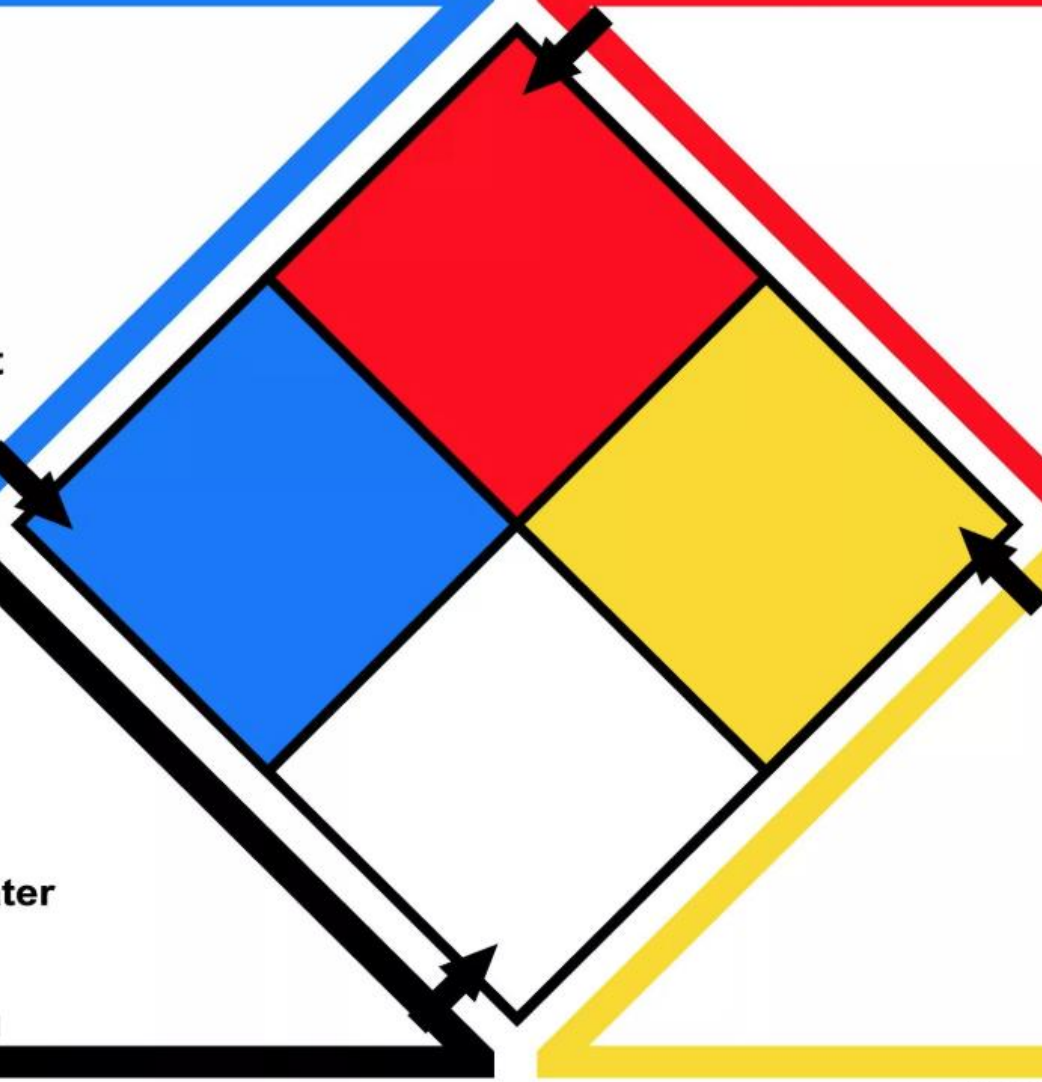
Black on Orange

DANGER

Death or Serious Injury Likely

Black and Red on White Background

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

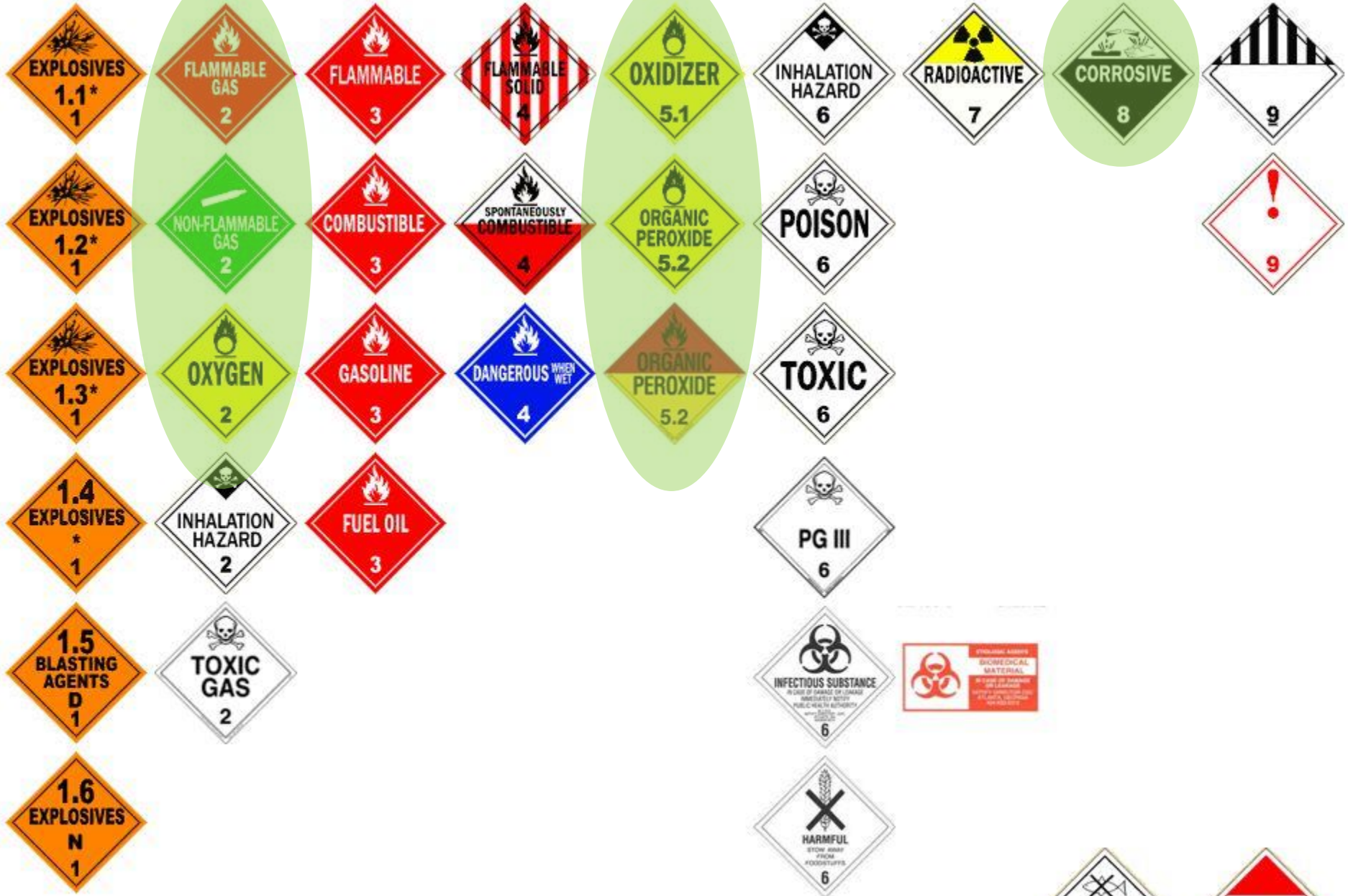
4 = Will vaporize and readily burn at normal temperatures
3 = Can be ignited under almost all ambient temperatures
2 = Must be heated or high ambient temperature to burn
1 = Must be preheated before ignition can occur
0 = Will not burn

SPECIAL HAZARD

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

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

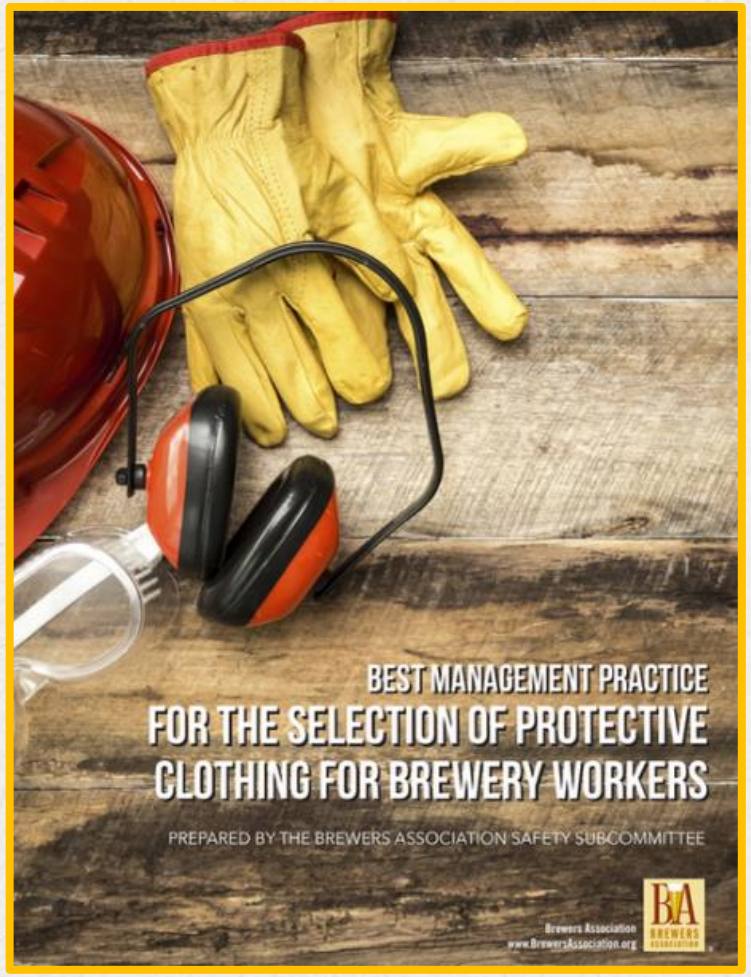


US DOT Hazmat Class & Division Placards

PPE

LIMITATIONS

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



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

A Deeper Dive on Brewery Chemicals

Brewery Chemicals

Thursday, 11:00-12:00, Rm 505-507

Presenter: Matt Stinchfield
BA Safety Ambassador

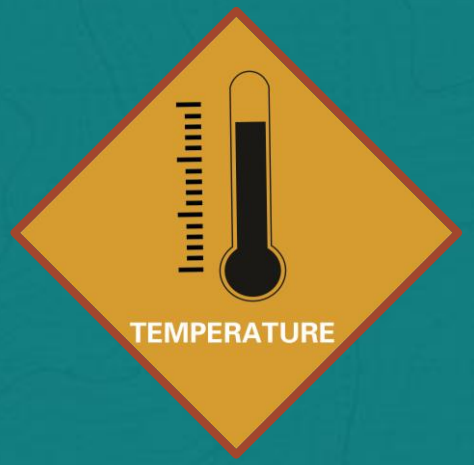
10 MINUTE BREAK

CHECK OUT THE SELFIE PANELS

SPECIAL BREWERY HAZARDS

A DEEPER DIVE ON
THREE IMPORTANT
HAZARDS

KETTLE BOILOVERS



KETTLE BOILOVERS

TASKS

- Wort Boiling
- Hop Addition

HAZARDS

- Deep Tissue Burns/Fatality
- Permanent Disability
- PTSD
- Production Shutdown and Product Loss

CAUSES

- Overcharging kettle volume
- Lack of foam controls
- Rapid hop addition
- Failure to monitor temp.

KETTLE BOILOVERS

ENGINEERING CONTROLS

- Foam shutoff switch
- Anti-foam agent
- Spray hose to cool
- Temperature sensor
- Manway positioning in regard to operator

PROCEDURAL & PPE

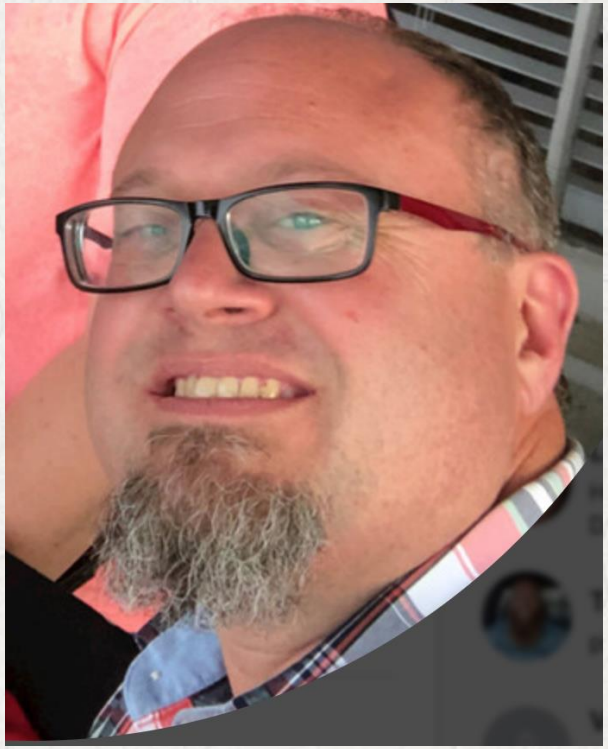
- Stick to design volumes
- Avoid “line of fire”
- Gradual hop addition, only after hot break
- Follow an SOP
- Eye protection, insulated gloves, long pants over boots

More Detail on this Vital Subject

Brewery Burns

Wednesday, 2:40-3:40, Rm 505-507

Presenter: Matt Stinchfield
BA Safety Ambassador



Brian Godfrey

Senior EHS Specialist

TRC Companies, Inc.

Greenville, South Carolina

brian-godfrey-b604b123

PRESSURIZED SYSTEMS:

PROTECTING CELLAR VESSELS

PRESSURE FAILURES: CELLAR VESSELS

TASKS

- CIP cleaning
- Fermentation
- Racking
- Carbonating, nitrogenating

HAZARDS

- Implosion
- Explosion
  - Beer cannon
  - Tank rocket
- Flying objects
- Production Shutdown and Product Loss

CAUSES

- Temp. delta in a closed system
- CO_2 - Caustic rxn.
- Transfer w/o open inlet valve
- Runaway fermentation
- PRV/VRV failure or absence

PRESSURIZED SYSTEMS

CELLAR VESSEL HAZARD CONTROLS

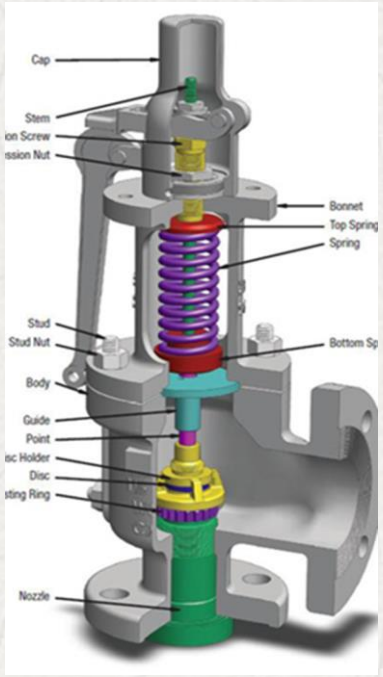
ENGINEERING CONTROLS

- Safety valve
- Pressure Relief Valve (PRV)
- Vacuum Relief Valve (VRV)
- Burst disk, or Rupture disk
- Correct sizing and pressure/vacuum settings

PROCEDURAL & SWP

- Follow an SOP
- Understand chemical and physical reasons for tank failure
- Know MAWP
- Inventory valves
- Schedule relief valve inspection and cleaning

TYPES OF PRESSURE RELIEF DEVICES

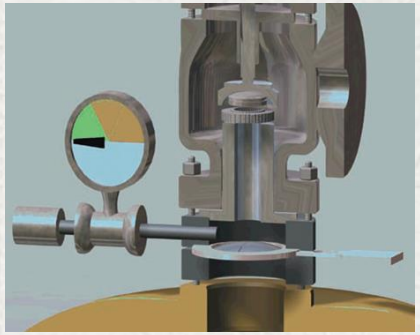


Conventional Pressure Relief Valve

Common Spring-loaded Tri-clamp Pressure Relief Valve

Rupture Disk

Storage Tank Relief Device (protects overpressure and vacuum)



Pressure Relief Valve / Rupture Disk Combination

Lever Action Pressure Relief Valve

PRESSURIZED SYSTEMS

HOSE COUPLINGS

PRESSURE FAILURES: PACKAGING & DISPENSE

TASKS

- Keg cleaning, filling
- Canning, bottling lines
- Draught dispense system

HAZARDS

- Hose/Fitting failure
- Flying objects
- Chemical spray
- Production Shutdown and Product Loss

CAUSES

- Lack of pressure protection
  - Secondary regulator
  - Safety valve
- Improper hose, fittings, couplers
- Improper order of opening/closing lines

PRESSURIZED SYSTEMS

PACKAGING AND DISPENSE HAZARD CONTROLS

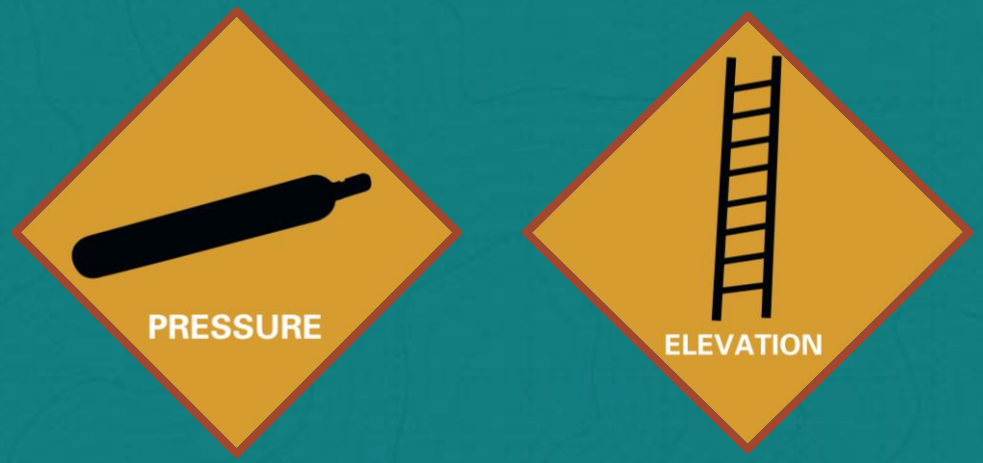
ENGINEERING CONTROLS

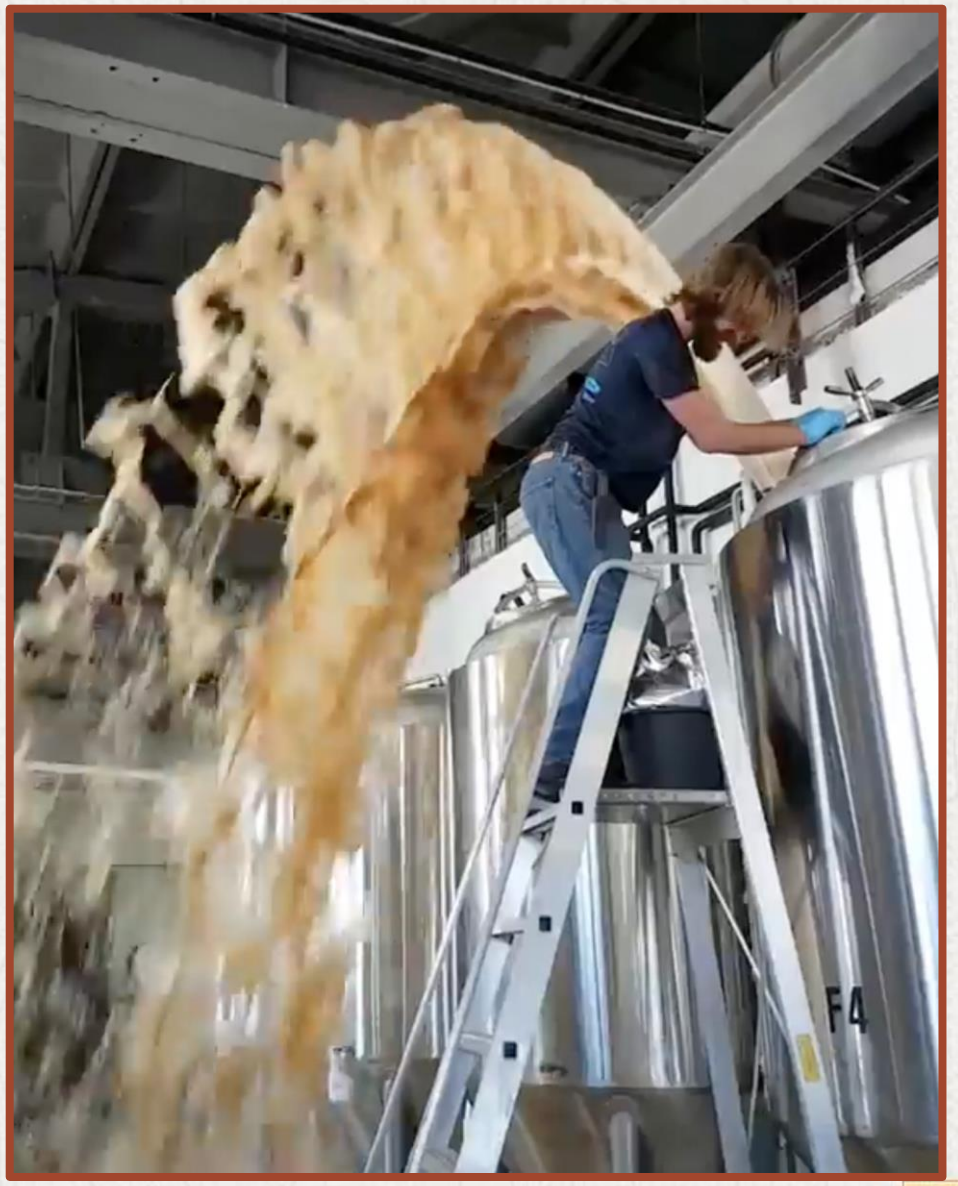
- Secondary regulators and pressure gauges at point of equipment connection
- Safety valves
- Plexiglas panels
- Proper connections
  - Oetiker clamps
  - Factory installed hose fittings
  - DO NOT USE worm clamps

PROCEDURAL & SWP

- Follow an SOP
- Understand how to depressurize system before uncoupling
- Know correct operating pressure of all equipment
- Regularly inspect, cleaning, replace wearable parts

DRY HOPPING FAILS





DRY HOPPING FAILS, a.k.a. “POPCORNING” or “HOP VOLCANO”

TASKS

- Dry Hopping
- Adding Seasonings or Fruit Flavoring
- PRV Cleaning

HAZARDS

- Flying Objects due to Pressure
- CO_2 Overexposure
- Risk of Falling from Height

CONTROLS

- Engineering Controls
- Established Procedures
- Safe Work Practices
  - Working at height
- PPE
  - Fall protection

DRY HOPPING

HAZARD CONTROLS

PRESSURE HAZARDS

- Blow down CO_2 head pressure per an SOP
- Keep pressure gauges and PRVs clean, operational
- Consider hop doser or recirculation equip.
- Don’t exceed design volume
- Add ingredients slowly

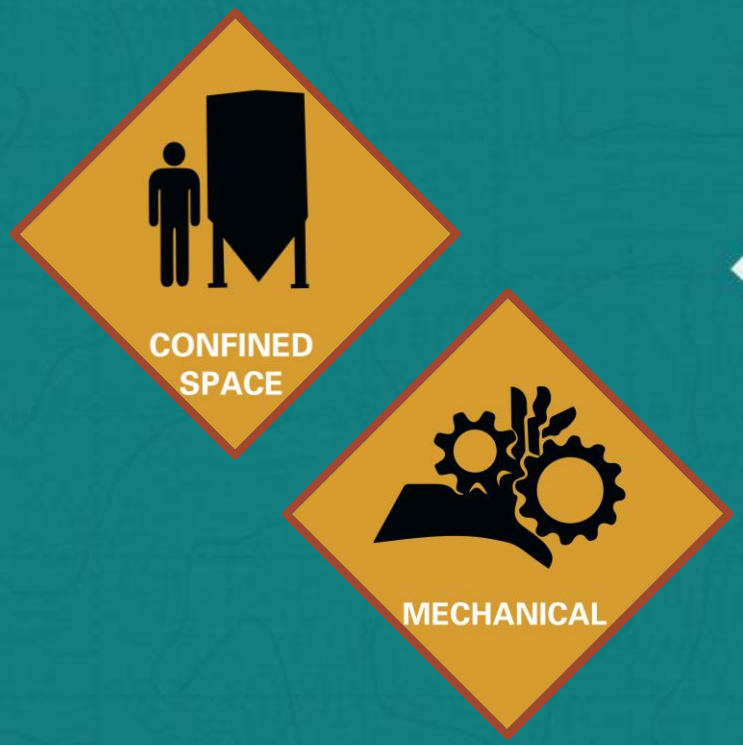
WORKING AT HEIGHTS

- Choose best ladder or lift your resources allow
  - Scissor lift
  - Rolling platform stairs
  - Extension ladder or step ladder
- Harness, Anchor, Tether

CONFINED SPACES & LOCKOUT/TAGOUT

INCREASE YOUR AWARENESS &
SYSTEMATIZE YOUR PROCEDURES

CONFINED SPACES



ACCIDENTS

- **Confined space accidents are rare**
  - Often fatal
  - Often involve more than one person
- **Accidents are easily preventable**
- **Majority of deaths are would-be rescuers**

DEFINITION

CONFINED SPACE

- Large enough to bodily enter and perform work
- Limited means of entry or exit
- Not designed for continuous human occupancy

EXAMPLES

- Brewhouse Vessels MT, LT, BK, WP, HLT, CLT
- Fermenters
- Bright Tanks
- CIP Tanks
- Yeast Brink
- Wastewater treatment tanks, sumps
- Grain Silos

PERMIT-REQUIRED CONFINED SPACE

1. **Potential to contain hazardous atmosphere**
   - **O_2 deficient atmosphere**
   - **Elevated CO_2 levels**

PERMIT-REQUIRED CONFINED SPACE

2. **Engulfment Hazard**
   - **Water**
   - **Grain**

PERMIT-REQUIRED CONFINED SPACE

3. **Inwardly converging walls or a floor that slopes downward and tapers to a smaller cross section.**
   - **Fermenters**
   - **Silos**

PERMIT-REQUIRED CONFINED SPACE

4. **Contains any other recognized serious safety or health hazards**
   - **Mash mixer**
   - **Lauter tun rakes**

WHAT CONSTITUTES ENTRY?

Any part of the entrant's body breaks the plane of an opening into a confined space

Examples

- **Inspecting inside of FV/BBT**
- **Emptying spent grain from LT**
- **Cleaning FV**
- **Equipment Repairs**

Image: Jock Fistick / South Florida Business Journal

HOW DO YOU PROPERLY ENTER A PERMIT-REQUIRED CONFINED SPACE?

ENTERING MEANS

If any part of the entrant's body breaks the plane of an opening into a confined space…

YOU MUST HAVE

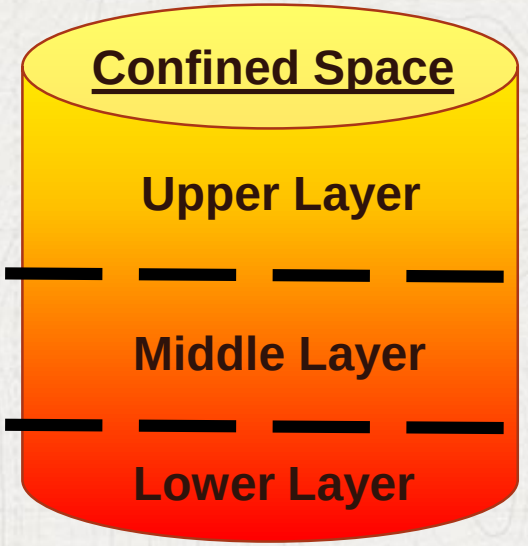
- Written Program
- Hazard Assessment of Spaces
- Entry Permits
- Atmospheric Testing
- Specific Safe Procedures
- Authorized Entrant, Attendant
- Emergency Rescue Procedures
- Training

HOW DO YOU PROPERLY ENTER A PRCS?

- **RETRIEVAL SYSTEM**

OSHA: "A mechanical device must be available to retrieve personnel from a vertical space more than 5 feet deep."

- **ATMOSPHERIC TESTING**
  - **Test all levels/depths, multifunction meter**
  - **Document readings on the permit or in hazard assessment**
- **BREWERY ATMOSHPERIC HAZARDS**
  - **FV/BBTs: Excess CO_2 or N_2, O_2 Deficiency**
  - **Wastewater treatment: H_2S**
  - **Near direct flames or propane PITs: CO**



IS THERE AN ALTERNATIVE TO PRCS ENTRY REQUIREMENTS?

RECLASSIFICATION

- Space poses no actual or potential atmospheric hazard
- All hazards within the space can be eliminated without entry into the space (LO/TO)

- **Useful for Brewhouse Vessels – MT, LT, BK, WP**
- **Documentation**
  - Written Program
  - Hazard Assessment
  - Written Procedure
  - Training

CONFINED SPACE SUMMARY

TASKS

- Brewhouse Vessel Cleaning
- FV/BBT Cleaning
- Water and Waste-water Inspection

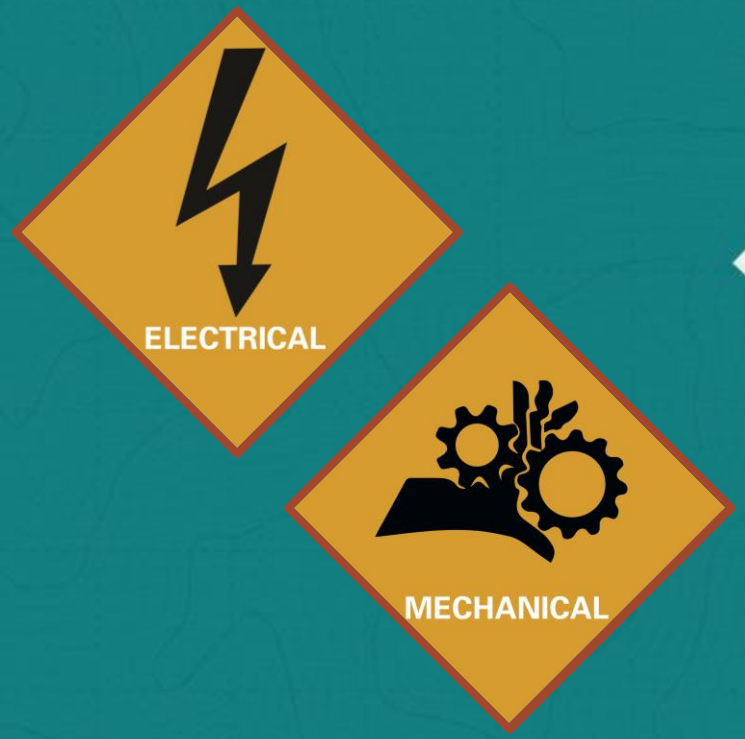
HAZARDS

- O_2 Deficiency
- Mechanical Hazards
- High Temperature

CONTROLS

- Air Monitoring
- Engineering
  - LO/TO
  - Forced Air Flow
- Administrative
  - Hazard Assessment
  - Reclassification
  - SOPs & Training

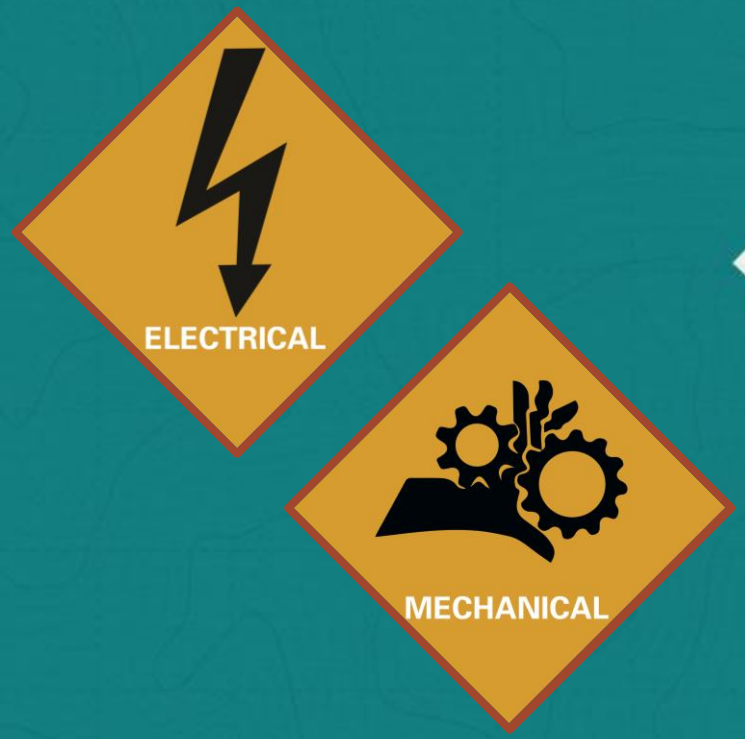
CONTROL OF HAZARDOUS ENERGY (LO/TO)



LOCKOUT / TAGOUT

- **To isolate and control hazardous energy sources**
  - Electrical
  - Mechanical
  - Pneumatic, etc.
- **LO/TO equipment is specialized**
  - Use LO/TO devices only for LO/TO work

CONTROL OF HAZARDOUS ENERGY (LO/TO)



WHEN TO USE LO/TO

- Remove or bypass any safety device on a piece of machinery
- Place any part of your body into a point of operation where a danger zone exists during an operating cycle

WHEN IS LO/TO REQUIRED?

- Risk of unexpected energization or start-up of equipment
- Work with risk of uncontrolled release of hazardous energy

- High voltage electrical and live electrical work
- Confined space entry
- Removal or disabling of safety systems or devices

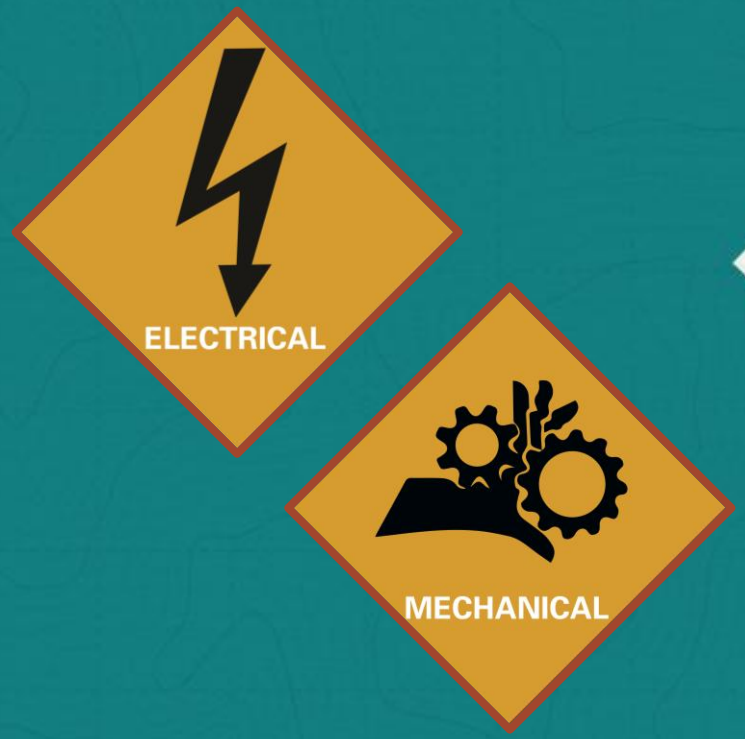
NOT REQUIRED FOR

- Minor Tool Changes
- Minor Adjustments

MUST Meet all three

- Occurs during normal production operations on easily surveyable equipment
- Activities are routine, repetitive and integral
- Performed using alternative measures to safely perform task without being exposed to hazardous energy

CONTROL OF HAZARDOUS ENERGY (LO/TO)



TYPES OF HAZARDOUS ENERGY

- Electrical
- Mechanical
- Stored or potential (springs, gravity, etc.)
- Thermal
- Hydraulics (fluid) or pneumatic (air)
- Chemical
- Radiation (nuclear gauges)

ENERGY CONTROL PROCEDURE (ECP)

ECP is an SOP that describes shutdown and startup for systems with multiple energy sources

- **Procedural steps**
  - shutting down
  - isolating, blocking, and securing
  - restoring

- **Procedural steps**
  - placement, removal, and transfer of LO/TO devices
  - who has responsibility for them
- **Requirement for testing a piece of equipment to verify effectiveness of LO/TO devices – a.k.a. The TRY STEP**

TRY STEP

- **Verifies isolation**
- **May release residual or stored energy**
- **Confirms correct energy sources are controlled**
- **Keep persons safe while performing the Try Step**

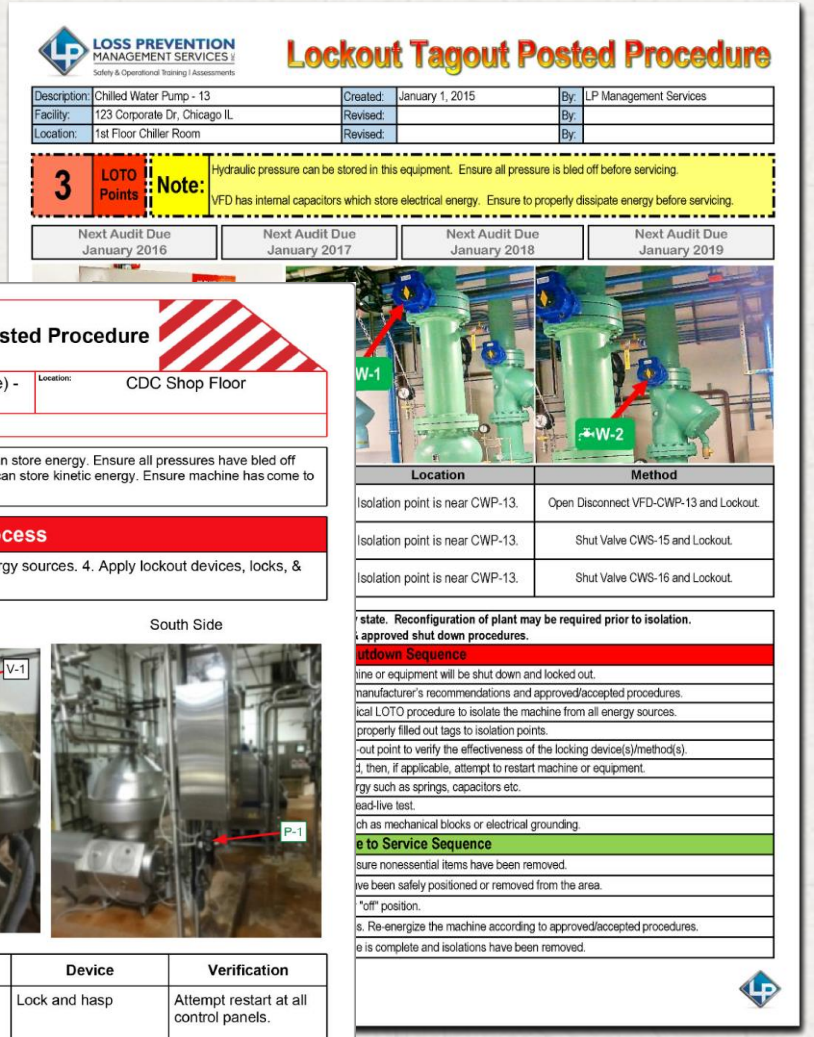
ENERGY CONTROL PROCEDURE (ECP)

EQUIPMENT-SPECIFIC

- Often includes images
- Color-coded energy control points

ONLINE ECP GENERATORS

- Subscription-based
- Some free tools available



LOSS PREVENTION MANAGEMENT SERVICES

Lockout Tagout Posted Procedure

Description:	Chilled Water Pump - 13	Created:	January 1, 2015	By:	LP Management Services
Facility:	123 Corporate Dr, Chicago IL	Revised:		By:	
Location:	1st Floor Chiller Room	Revised:		By:	

3 LOTO Points

Note: Hydraulic pressure can be stored in this equipment. Ensure all pressure is bled off before servicing.
VFD has internal capacitors which store electrical energy. Ensure to properly dissipate energy before servicing.

Next Audit Due January 2016	Next Audit Due January 2017	Next Audit Due January 2018	Next Audit Due January 2019

W-1 W-2

Location	Method
Isolation point is near CWP-13.	Open Disconnect VFD-CWP-13 and Lockout.
Isolation point is near CWP-13.	Shut Valve CWS-15 and Lockout.
Isolation point is near CWP-13.	Shut Valve CWS-16 and Lockout.

state. Reconfiguration of plant may be required prior to isolation.
approved shut down procedures.

utdown Sequence
ine or equipment will be shut down and locked out.
manufacturer's recommendations and approved/accepted procedures.
ical LOTO procedure to isolate the machine from all energy sources.
properly filled out tags to isolation points.
-out point to verify the effectiveness of the locking device(s)/method(s).
d, then, if applicable, attempt to restart machine or equipment.
rgy such as springs, capacitors etc.
ead-live test.
ch as mechanical blocks or electrical grounding.

e to Service Sequence
sure nonessential items have been removed.
ve been safely positioned or removed from the area.
"off" position.
s. Re-energize the machine according to approved/accepted procedures.
e is complete and isolations have been removed.

LINK 360 Lockout/Tagout Posted Procedure

ID#:	1234567890	Facility:	Test Area: (Good Hope) - CDC	Location:	CDC Shop Floor
Created:	10/8/2013	Description:	HTST-1 Separator		
Revised:	10/8/2013				

5 Lockout Points

Note: Hydraulic and pneumatic equipment can store energy. Ensure all pressures have bled off before proceeding. - ALSO - Machine can store kinetic energy. Ensure machine has come to a complete stop before proceeding.

Lockout Application Process

1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

MCC SWBB21 North Side South Side

E-1 V-1 W-1 V-2 P-1

Energy Source	Location	Method	Device	Verification
1 Electrical 480V	Disconnect is located on MCC SWBB21 (Bucket 1).	Turn Disconnect to the off position and lock out.	Lock and hasp	Attempt restart at all control panels.
2 Pneumatic 100 PSI	Ball Valve P-1 is located on the South side of the machine.	Turn Valve to the off position and lock out.	Lock and hasp	Verify pressure has bled off.
3 Water City Water Supply	Ball Valve W-1 is located on the East side of the machine.	Turn Valve to the off position and lock out.	Ball valve lockout	Verify pressure has bled off.
4 Valve				

BREWERS ASSOCIATION

LO/TO DEVICES

LOCKS

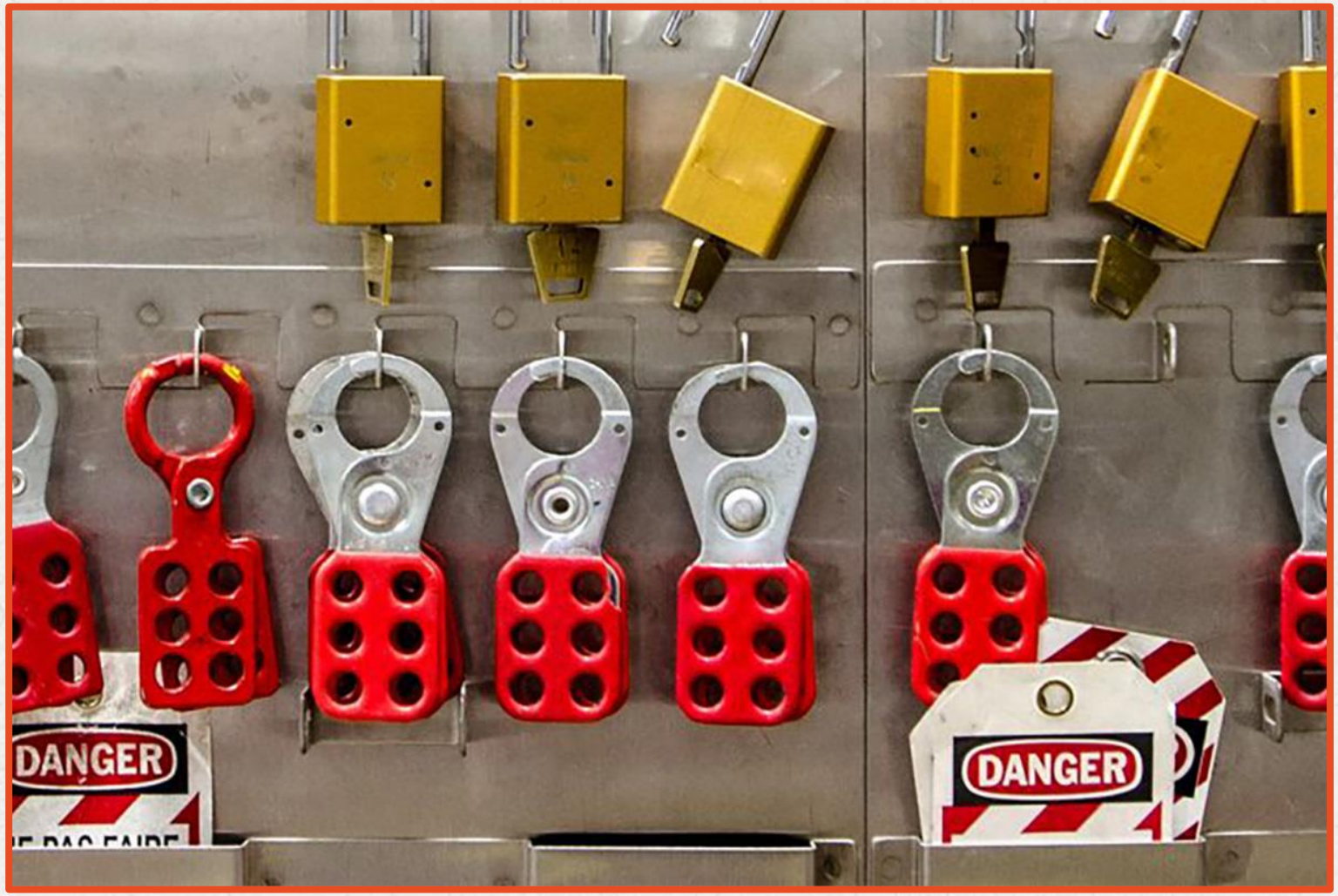
- Only used for LO/TO
- Only 1 key
- Key kept by operator being protected by LO/TO

TAGS

- Provide a message

HASPS

- Allow multiple locks



LO/TO DEVICES

LOCK BOXES

- Isolate small equipment from use
- Allow multiple keys to be locked

LO/TO DEVICES

ELECTRICAL TYPES

PLUG LOCKOUT

- Isolates plug end from being plugged in

BREAKER DEVICES

- Isolates energy at electrical panel

DISCONNECT LOCKOUT

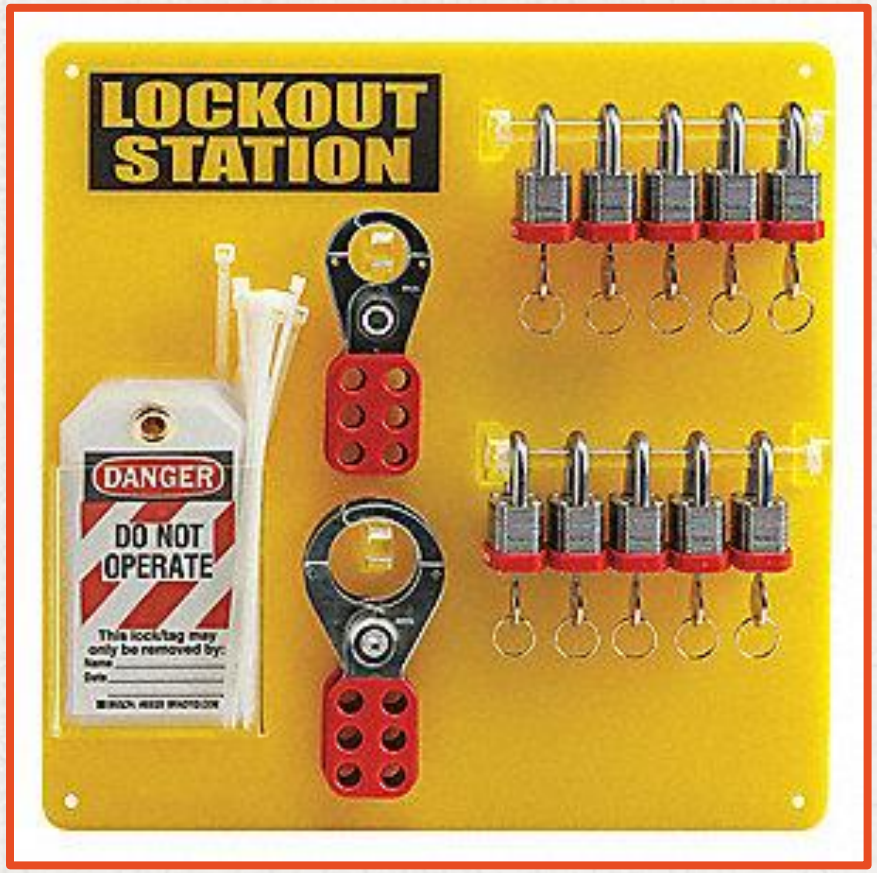
LO/TO DEVICES

FLUID CONTROL

VALVE DEVICES

- Ball valve
- Butterfly
- Gate valve

LO/TO DEVICE KITS AND STATIONS



LO/TO SUMMARY - ACHIEVE A ZERO ENERGY STATE

TASKS

- **Brewhouse Vessel Cleaning**
- **Packaging**
  - Conveyors
  - Fillers
  - Drop Packers
  - Palletizers
- **Single Sources**
  - Electric Cords

HAZARDS

- **Mechanical Hazards**
  - Crush/Pinch
  - Fly Objects
- **Electrical**
  - Electric shock
  - Electrocution
- **Fluid Energy Release**
  - Bodily Injury

CONTROLS

- **Engineering**
  - LO/TO Devices
- **Administrative**
  - Energy Control Procedures
  - SOPs & Training

Another Great Presentation This Week – Don't Miss It!

Lockout / Tagout

Tuesday, 1:20-2:20, Rm 505-507

Presenter: Tony McCrimmon

WRAP UP

LARRY QUESTIONS FOR US?

QUESTIONS FOR YOU!

GRAND FINALE

[CELLAR BOY]

I'm a cellarjack and I'm OK
I work all night and I sleep all day

[ALL SING]

He's a cellarjack and he's OK
He works all night and he sleeps all day

[CELLAR BOY]

I clean the tanks, I eat my lunch,
I shine the BBT
On Wednesdays I’m dry-hopping and follow my SOP

[ALL SING]

He cleans the tanks,
He eats his lunch,
He shines the BBT
On Wednesdays he’s dry-hopping and follows his SOP

[CELLAR BOY]

I'm a cellarjack and I'm OK
I work all night and I sleep all day
I clean the tanks, walk like a duck
I like to drink craft beer
I wear my forklift seatbelt and watch for
who’ever’s near

[ALL SING]

He cleans the tanks,
Walks like a duck
He likes to drink craft beer
He wears his forklift seatbelt and
Watches for who’ever’s near

[CELLAR BOY]

I'm a cellarjack and I'm OK
I work all night and I sleep all day
I clean the tanks, I sniff dank hops
Secretly I mill the malt
I wish I'd been a brewer, just like my dear friend Walt

[ALL SING]

He cleans the tanks,
He sniffs dank hops?
Secretly he mills the malt?

Oh, he's a cellarjack and he's OK
He works all night and he sleeps all day
He's a cellarjack and he's Okayyyyyy
He works all night and he sleeps all day!

Social Media Handles

@BrewersAssoc

#CraftBrewersCon

#BrewerySafety

#BrewSafely

Brewery Safety Bootcamp

We Thank You For Your Attention!