WORLD BREWING CONGRESS
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#ElevateBeer

Safety Risks in Brewing Labs

Presented By:
Jamie Wenham
Sierra Nevada Brewing Co.

ASBC Lab Safety Checklist

- Great reference for General Good Lab Practices (GLP)
- Includes an outline of hazards present in brewery labs
- A few hazards from the safety checklist will be covered in this presentation

Top 5 Laboratory Risks

Lab risks associated with ASBC's Beer Bitterness method…

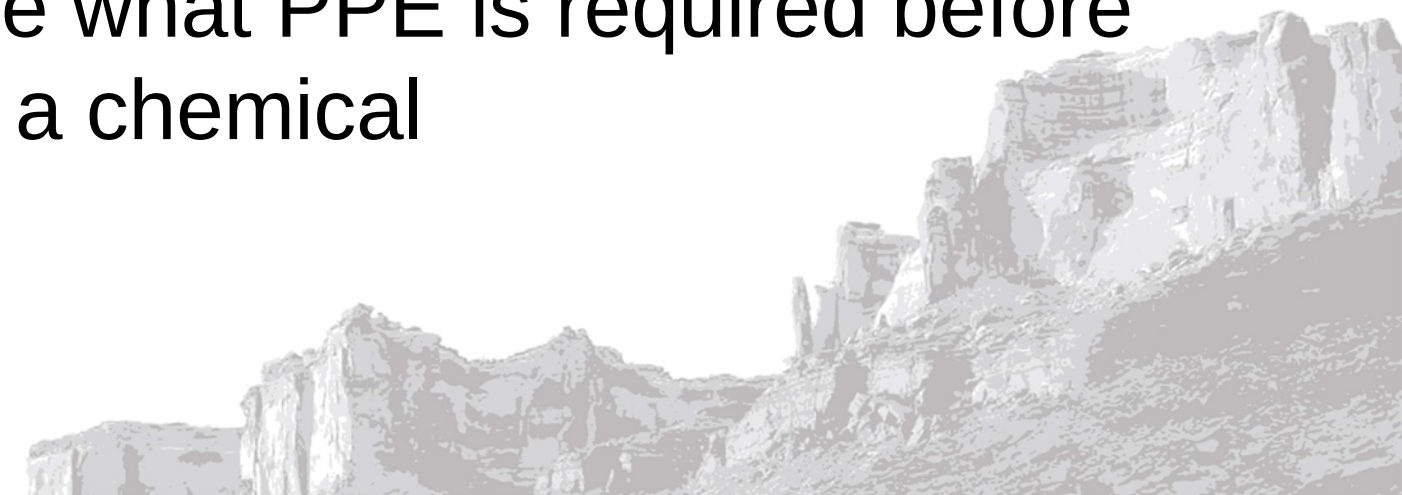
1. Chemicals
2. Fire and Flammable Liquids
3. Glassware
4. Fume Hoods

The final risk is not part of the bitterness method but is always present in the lab…

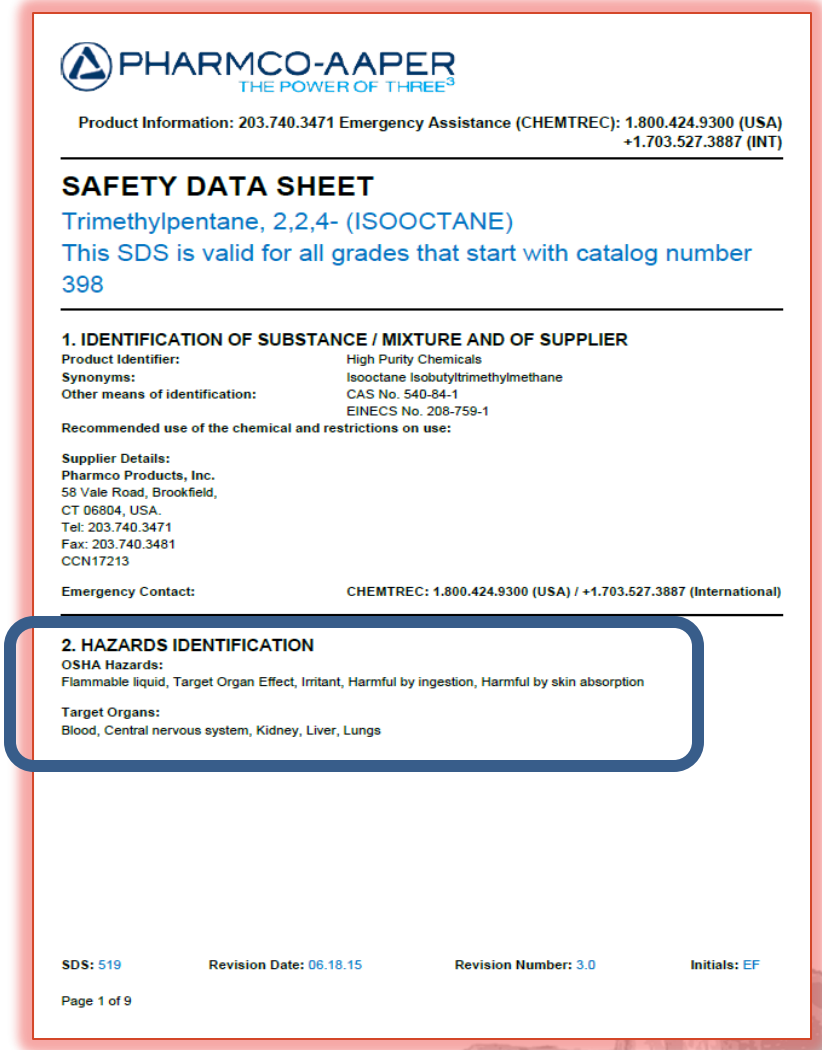
5. Pressurized Gas

Chemical Safety

- ASBC's Beer Bitterness method calls for Isooctane and 6N Hydrochloric Acid
- When using chemicals, proper Personal Protective Equipment (PPE) must be used
- Review the Safety Data Sheet (SDS) to determine what PPE is required before handling a chemical



Safety Data Sheet



PHARMCO-AAPER
THE POWER OF THREE®

Product Information: 203.740.3471 Emergency Assistance (CHEMTREC): 1.800.424.9300 (USA)
+1.703.527.3887 (INT)

SAFETY DATA SHEET

Trimethylpentane, 2,2,4- (ISOOCTANE)
This SDS is valid for all grades that start with catalog number 398

1. IDENTIFICATION OF SUBSTANCE / MIXTURE AND OF SUPPLIER

Product Identifier: High Purity Chemicals
Synonyms: Isooctane Isobutyltrimethylmethane
Other means of identification: CAS No. 540-84-1
EINECS No. 208-759-1
Recommended use of the chemical and restrictions on use:

Supplier Details:
Pharmco Products, Inc.
58 Vale Road, Brookfield,
CT 06804, USA.
Tel: 203.740.3471
Fax: 203.740.3481
CCN17213

Emergency Contact: **CHEMTREC: 1.800.424.9300 (USA) / +1.703.527.3887 (International)**

2. HAZARDS IDENTIFICATION
OSHA Hazards:
Flammable liquid, Target Organ Effect, Irritant, Harmful by ingestion, Harmful by skin absorption

Target Organs:
Blood, Central nervous system, Kidney, Liver, Lungs

SDS: 519 **Revision Date:** 06.18.15 **Revision Number:** 3.0 **Initials:** EF

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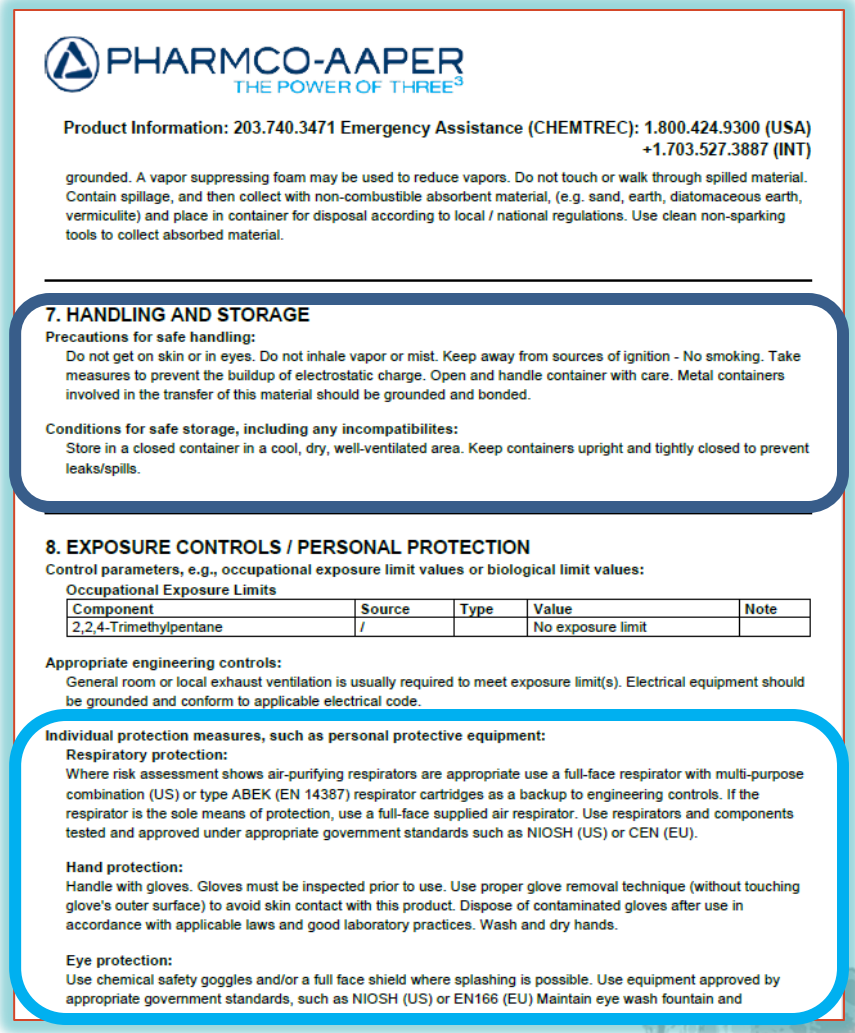
- Contains information for proper chemical handling and the associated hazards.
- Examples of Proper PPE include: Eyewear, Gloves, Respiratory Protection, etc.

Chemical Storage



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grounded. A vapor suppressing foam may be used to reduce vapors. Do not touch or walk through spilled material. Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations. Use clean non-sparking tools to collect absorbed material.

7. HANDLING AND STORAGE

Precautions for safe handling:

Do not get on skin or in eyes. Do not inhale vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge. Open and handle container with care. Metal containers involved in the transfer of this material should be grounded and bonded.

Conditions for safe storage, including any incompatibilites:

Store in a closed container in a cool, dry, well-ventilated area. Keep containers upright and tightly closed to prevent leaks/spills.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters, e.g., occupational exposure limit values or biological limit values:

Occupational Exposure Limits

Component	Source	Type	Value	Note
2,2,4-Trimethylpentane	/		No exposure limit	

Appropriate engineering controls:

General room or local exhaust ventilation is usually required to meet exposure limit(s). Electrical equipment should be grounded and conform to applicable electrical code.

Individual protection measures, such as personal protective equipment:

Respiratory protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Use equipment approved by appropriate government standards, such as NIOSH (US) or EN166 (EU) Maintain eye wash fountain and

- Proper storage of chemicals is extremely important.
  - Acid/Base cabinet
  - Maintain a good amount of distance between acid and base storage. If space is limited, include physical barriers.

Flammable Liquids and Fire Safety

- Isooctane is highly flammable
- Flammable liquids must be stored or use away from possible ignition sources such as:
  - Electrical equipment
  - Gas burners
- Important to conduct a safety training on how to properly use a fire extinguisher
- If a fire does occur, contact emergency services

Fire Safety

- On a monthly basis, the Lab's safety representative checks the fire extinguishers to make sure they are in good condition, the zip tie is in place and the gauge needle is in the green charged area.

Flame Cabinet

Outdoor Flame Cabinet

Lab Flame cabinet

Glassware Safety

- Most labs use glassware to collect different kinds of samples
- There are several hazards surrounding glassware that include: cuts, cross-contamination and explosions.
- ASBC's beer bitterness method calls for volumetric pipettes to be used.
- PPE for hot glassware
  - Safety glasses or goggles
  - Heat-resistant gloves

Glass Disposal

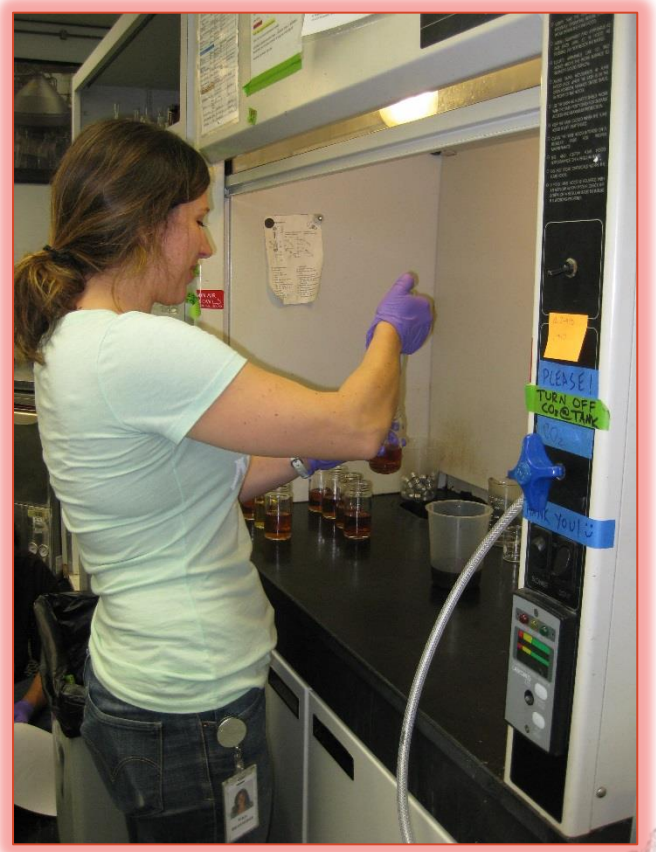
- Have a safe disposal for broken glass
- Need proper PPE to handle broken Glassware
  - Gloves
  - Eye protection
  - Lab coat

  A broom and pan makes for easy clean up

Autoclaved Glassware

Fume Hood Safety

What is incorrect about this picture with the fume hood?



Why is it important to use a fume hood?

- It is a barrier between technician and hazardous chemicals such as isooctane and hydrochloric acid.
- Designed to redirect hazardous fumes away from technician when used correctly
- Most of the beer bitterness procedure should be conducted in the fume hood.

Fume Hood Safety

- This is the proper way to use a fume hood
- Fume hoods are not safe for chemical storage
- Maintain preventative maintenance to ensure proper function of the ventilation fan
- Check airflow monthly as part as the safety inspection

Compressed Gas Safety

- ASBC's Beer Bitterness method does not involve compressed gases but this is a major hazard in lab
- The lab primarily uses standard compression cylinders for more efficient gas storage. However, the gas is under a great amount of pressure for this type of storage.
- A small gas leak can be very hazardous

Compressed Gas Safety

- Properly chain and cap gas cylinders
- Ensure the cylinder is properly labeled and maintained
- Never rely on the color of a label or cylinder for identification

Safety Checklist

Sierra Nevada Brewing Co. HEALTH & SAFETY MANUAL	Department:: H & S	Page: 1 of 2
	Procedure No: HS-F-02	Original Date Issued: 2010
FORM: Department Inspection Checklist - Quality	H&S Binder#:	Last Updated: 7/27/2017

The Sierra Nevada Injury and Illness Prevention Plan require supervisors or authorized employees to conduct work area inspections monthly. Indicate deficiencies found and how they were corrected, date of the repair/correction. Additional space has been provided to include inspection items unique to the area.

Procedure: Checkmark all line items. Indicate deficiencies found and how they were corrected and the date of the repair/correction. Additional space is been provided for you to include inspection items unique to the area. If a line item is not relevant line it out and include an explanation why it does not apply. **Areas of responsibility: Labs, lab storage, workstations, offices**

Department: ____QA_____ Date Prepared: _____

Inspector's Name: _____Manager/Supervisor's Signature: _____

Personal Protective Equipment:

Employees are using the appropriate glove to protect against chemicals, hot or cold objects, or nicks and cuts.		
Employee is wearing approved Slip Resistant shoe/Rubber Boot in good condition		
Employee is wearing appropriate eye protection (safety glasses, goggles, face shields, etc.) to protect against splashing, welding, or flying objects.		

Eye Wash shower inspection and documentation: *Indicate the number of the unit inspected; check or test the following: Caps on/Bowl clean and debris free, water flowed and temperature checked for 30 seconds/tagged signed and dated. Caps replace when test is done.*

Unit #	*location*	*condition*	*work order submitted*
#3	**Sink unit – Main lab**		
#22	**Sink unit – Package lab**		

Electrical:

Knockouts in, breakers labeled, conduit, outlets, covers		
Clear access to electrical panel and disconnect		
Nothing stacked on electrical panel		
Electrical cords and plugs are in good working condition		
Work station cords are not a trip hazard		

Material Handling and Storage:

Material is stored so as to not create a hazard. Material is stacked, blocked, or otherwise secured to prevent sliding or collapse.		
Where equipment is used to handle material, sufficient clearance area is available to allow safe handling.		

Housekeeping:

Floors are free of debris, spilled liquids, and trip hazards.		
Equipment (broom, ladder, etc.) is placed so as not to create a hazard (kept hung-up or out of the walkways)		
Items do not protrude from counter tops so as to create a hazard. Sharp objects are stored so as to prevent accidental contact.		
Stored Materials at least 18 inched below the sprinkler.		
Mats are in good condition		
Ladders inspected for damaged, missing and loose parts		
Compressed gas canisters chained		
Empty cylinders capped		
Fire Blanket in cleanroom		

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Exits:

Exits and exit ways are clearly marked.		
Doorways are unobstructed. Doors are readily usable as an exit and operate easily.		
Door sensors are working properly		

Fire:

Trash and combustible materials are removed on a regular basis		
Emergency Plan and evacuation routes communicated or are posted.		

Chemicals:

MSDS online link: verify that it is working		
Posted emergency information; *white board near computer workstation, white board near clean room*		
Flammable cabinet doors close and latch properly		
Chemicals and secondary containers are properly labeled – no container has two or more conflicting labels – no hand written labels		
No food or drink in chemical areas.		
Containment pallets are in good condition- no containers overlapping edge of containment		
Chemicals are properly stored and used in accordance with the manufacturer's directions and good practices, including compatible storage and secondary containment.		
Bottle guards in place and in good repair (pkg lab)		

Ventilation:

Ventilation hoods have been tested and inspected within the last year.		
Fans for ventilation hoods are functioning properly		

Misc.:

EAP evacuation binder up-to-date and located?		
EAP first aid, spills, etc binder up-to-date and located?		

Fire Extinguishers: ***Inspection instructions:***

1. Check gauge making sure arrow is in the green or charged area. 2. Verify pin is in place and breakaway strap is attached. NOTE: If the breakaway strap is missing or broken then remove from service. Bring to safety for replacement and servicing. 3. Check for powder residue at the end of the discharge hose. If found bring the extinguisher to safety office for replacement.4. Note the following information below on the hang tag date/initial tag 5. Fire extinguisher is not blocked

Date checked	**location**	**condition**
	West Brewery lab - main entrance behind door	
	West Brewery lab - clean room (halon)	
	West Brewery – storage room by door into lab (halon)	
	Packaging Lab - north exit door	

Communication

- Communication is key in order for everyone to stay safe
- Important to keep staff updated on training:
    - Emergency Response
    - PPE use
    - Chemical Handling
    - Fire safety

- Have a list of emergency contacts posted in the lab, including: fire, ambulance, Immediate Care…