




# HEALTH AND SAFETY AWARENESS

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## FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

### About The Florida Department of Environmental Protection

The Florida Department of Environmental Protection (DEP) is the state's lead agency for environmental management and stewardship, protecting our air, water and land. DEP is divided into three primary areas:

- **Land and Recreation**
- **Regulatory**
- **Ecosystems Restoration**

DEP's mission is to protect, conserve and manage the state's natural resources and enforces its environmental laws. DEP's vision is to advance Florida's position as a world leader in protecting natural resources while growing the state's economy. DEP's values are leadership, integrity, accountability, communication, innovation and service.

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## HOW CAN DEP ASSIST

### How Can DEP Help You?

- Compliance assistance
- Education and information
- Recognizing environmental stewardship

**Compliance assistance:** The department helps residents and businesses comply with environmental regulations through site visits and technical support.

**Education and information:** Learn more about DEP's activities by signing up for a variety of digital newsletters, updates and announcements about the department's programs, activities and events.

**Recognizing environmental stewardship:** DEP encourages sound environmental practices through its sustainable initiative programs, including Clean Marinas, Green Lodging and Recycling Recognition.

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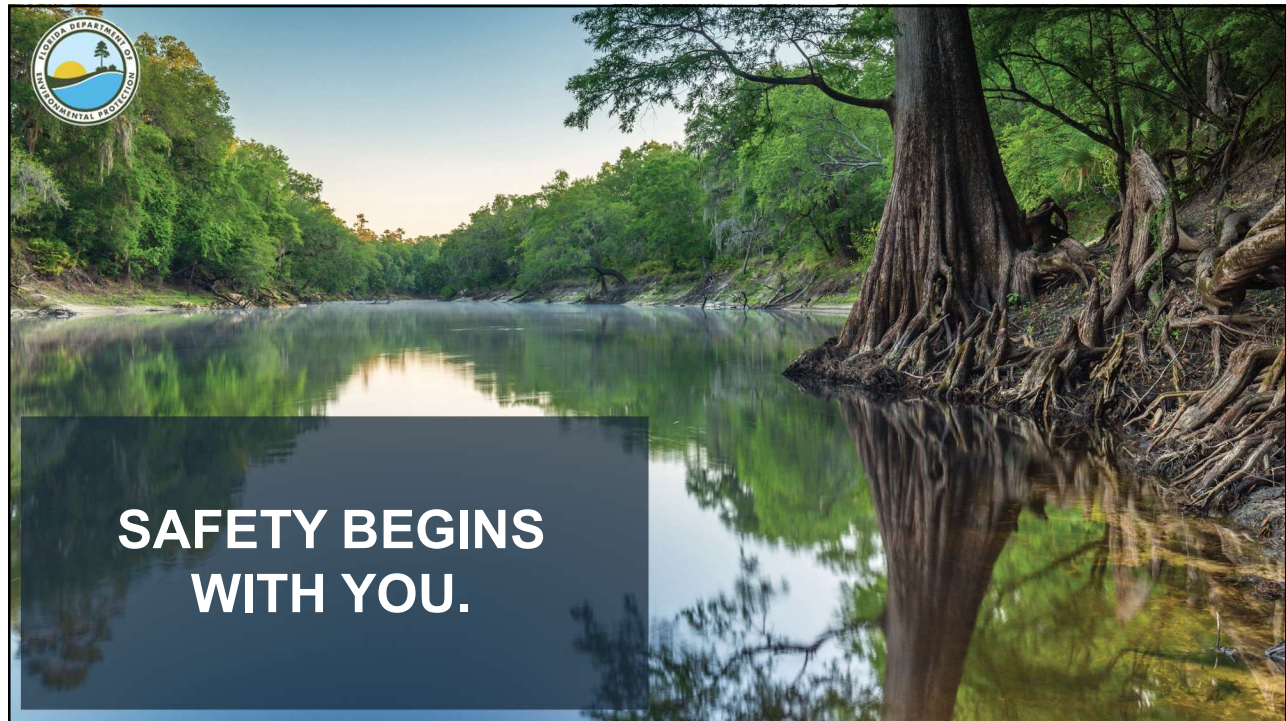
## DEP SAFETY OFFICE

The DEP Safety Office, under the Direction of Agency Safety Officer Jeff Loflin, serves to foster safety awareness and bring about a sound safety initiative throughout all programs within DEP.

[Jeff Loflin](#)


DEP Safety Officer  
850-245-2312

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**SAFETY BEGINS  
WITH YOU.**

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## PERSONAL PROTECTIVE EQUIPMENT (PPE)

Make sure you are prepared for the facility you are inspecting by:

- Wearing long pants.
- Having the proper type of clothing for the weather.

Do you have or need any of the following?

- Sunscreen.
- Insect Repellent.
- Safety Glasses.
- Hard Hat.
- Safety/Rubber Boots.
- Safety Hi-Visibility Vest.
- Ear Plugs.
- Gloves.
- Items kept in DEP Vehicles.




Photo credit: Runyon Surface Prep

\*These are DEP's general safety considerations.

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## PPE CONTINUED

- Find it fast.
- Make sure it fits.
  - Comfort **does** matter
  - Why?
    - Safety starts with **you**.

### DON'T DISREGARD COMFORT

Workers could have any number of objections to PPE, including:

- Too hot
- Too itchy
- Too big or small
- Doesn't breathe
- Takes too long to put on

Photo credit: Rigid Lifelines

\*These are DEP's general safety considerations.

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## PPE CONTINUED

The following PPE will be discussed on the subsequent slides:

- Foot Protection.
- Hand Protection.
- Eye Protection.
- Hearing Protection.

\*These are DEP's general safety considerations.

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## STEEL VS. COMPOSITE BOOTS

Specs	Steel	Composite
<b>Toe Material</b>	Steel	Carbon Fiber, Kevlar, etc.
<b>Weight</b>	Heavier than Composite	Lighter than Steel
<b>Conductivity</b>	Conducts heat and cold	None
<b>Durability</b>	Very durable	Less durable, possible cracking
<b>Cost</b>	Less expensive	Composite materials are more expensive



Photo credit: ANBU Safety

\*These are DEP's general safety considerations.

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## FOOT PROTECTION

**Steel shanks:** Boot shanks don't have to be made of steel, but steel shanks are the most common and are used to support the foot, particularly when climbing ladders.



Photo credit: Work Wear

**Puncture resistant:** Means that the sole is less likely to be penetrated by a sharp object. But you need to remember that puncture "resistant" is not the same thing as puncture "proof".



Photo credit: SFKTOP Shop

\*These are DEP's general safety considerations.

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## HAND PROTECTION

Glove selection requires research based on the chemicals to be encountered.

Safety needs to be balanced with dexterity needs.

Blends or layers optimize compatibility and improve chemical resistance.

Examples of glove types include:

- Neoprene/latex rubber.
- Viton/Neoprene.
- Viton/butyl rubber.



Photo credit: ASA Supplies

\*These are DEP's general safety considerations.

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## EYE PROTECTION

The Occupational Safety and Health Administration (OSHA) requires employers ensure the safety of employees by providing adequate eye and face protection when necessary.

Eyewear should:

- Provide protection for job-specific hazards.
- Fit snugly to the face without inhibiting movement or vision.
- Be comfortable to wear.
- Be durable.
- Be easy to clean or sanitize.
- American National Standards Institute (ANSI) Z87.1-2003-6.2.1
  - Standard for protective eye wear.



Photo credit: Harbor Freight



Photo credit: Harbor Freight

\*These are DEP's general safety considerations.

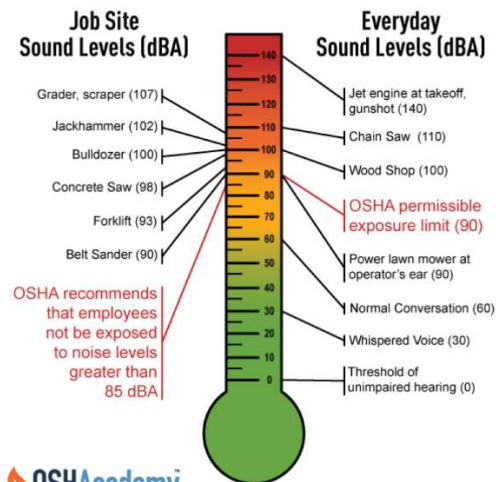
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## HEARING PROTECTION

OSHA requires development of a monitoring program when an employee's exposure maybe equal to or exceeded 85 decibels for 8-hours/day.

If you need to raise your voice to be heard an arm's length away, the noise is probably loud enough to damage your hearing.



**OSHAcademy**  
Occupational Safety & Health Training

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\*These are DEP's general safety considerations.

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## VEHICLE SAFETY

Vehicle equipment includes:

- Seat belts
- Mirrors
- Back-up alarms

Equipment should be checked periodically and repaired or replaced promptly as needed.



Photo credit: J.W. Speaker

\*These are DEP's general safety considerations.

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## VEHICLE SAFETY

Abide by the following items when driving:

- Do not speed and be sure to follow all road signs.
- Any electronic device (GPS, etc.) should only be manipulated when the vehicle is not moving.
- Do not text and drive.



Photo credit: Accuform NMC



Photo credit: IEEE Spectrum

\*These are DEP's general safety considerations.

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## PREPARE FOR THE INSPECTION

Prepare for inspections by:

- Reviewing past inspections, if available.
- Letting your manager/administrative assistant/co-workers know where you are going (Buddy System).
- Asking the following questions:
  - Is there any additional facility specific information?
  - What chemicals are used at the facility?
  - What type of waste is generated?
  - What type of exposure could you have?
  - Are there Safety Data Sheets [(SDSs) – formerly MSDSs] to review for the facility?

\*These are DEP's general safety considerations.

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## COMMUNICATION

Communication begins before you ever get to the site and can be in a variety of formats:

- Signs, pamphlets, labeling
- SDS
- Facility permit conditions
- The "buddy system":
  - Make sure somebody knows where you are

\*These are DEP's general safety considerations.

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## WHEN ON-SITE

Have facility personnel accompany you throughout the facility.

Watch for heavy equipment or vehicles moving around the facility.

Use caution when climbing ladders or walking on catwalks.



Photo credit: Environmental Resources Group



Photo credit: Construction Equipment Guide

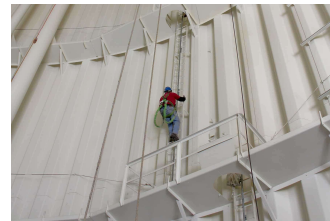



Photo credit: HR Green

\*These are DEP's general safety considerations.

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## CHEMICAL HAZARDS






<p><b>Flammable</b></p> 	<p><b>Corrosive</b></p> 
<p><b>Toxic</b></p> 	<p><b>Reactive</b></p> 

Photo credit: Canada Safety Training

\*These are DEP's general safety considerations.

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## TOXIC HAZARDS

- All chemicals possess some toxic characteristics:
  - For some chemicals, that toxic effect is toxicity.
- Toxicity limiting is when toxicity is the greatest hazard of the substance:
  - Heavy metals (e.g., lead, mercury).
  - Cyanides.





<b>Lead</b>	<b>Cadmium</b>	<b>Arsenic</b>	<b>Mercury</b>
			

Photo credit: Four Sigmatic

\*These are DEP's general safety considerations.

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## COMBUSTION HAZARDS

The most dangerous substances have:

- Low ignition energy (temperature).
- Low lower explosive limit (LEL).
- Wide flammable range.

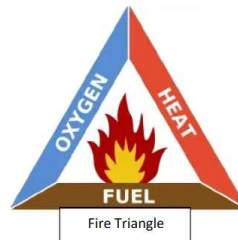
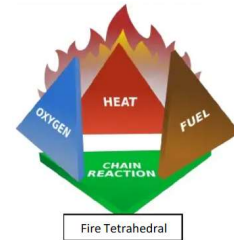


Photo credit: SCRIBD DRRR Handout



\*These are DEP's general safety considerations.

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## COMBUSTION HAZARDS CONTINUED

**LEL:** The minimum concentration of a substance needed to ignite and support combustion under normal atmospheric conditions. Below this the mixture is "lean".

**Upper explosive limit (UEL):** The maximum concentration of a substance that can be ignited and support combustion under normal atmospheric conditions. Above this the mixture is "rich".

\*These are DEP's general safety considerations.

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## FLAMMABLE RANGE

The concentration range of vapor or gas in air that will ignite if an ignition source is introduced.

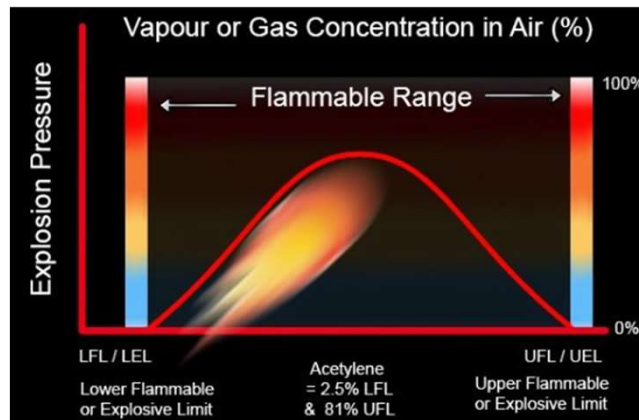


Photo credit: EICS Technology

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## FLASH POINT

The flash point is the lowest temperature at which a liquid produces enough vapor to support combustion when an ignition source is applied.

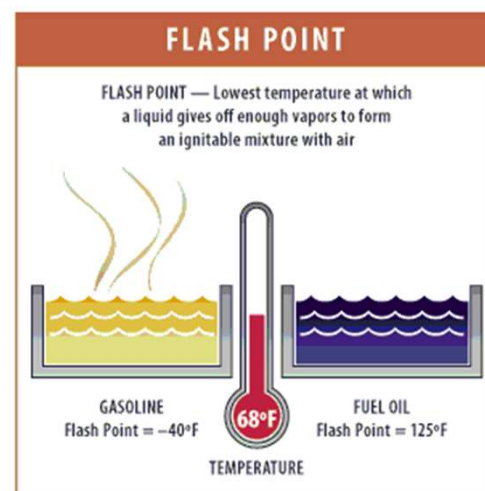


Photo credit: Britannica

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## WHAT IS FLAMMABLE?

- Flammability is determined by flashpoint in the applicable Code of Federal Regulations (CFR) and varies depends on which agency has jurisdiction.

Agency	Flashpoint
Department of Transportation	$\leq 140$ °F
U.S. Environmental Protection Agency	$< 140$ °F
OSHA	$\leq 100$ °F

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## EXPLOSIVITY HAZARDS — BLEVE

A Boiling Liquid Expanding Vapor Explosion (BLEVE) is a catastrophic event that occurs when a pressurized container containing a liquid, at a temperature above it's normal boiling point, fails due to excessive pressure or damage, releasing a burning vapor cloud.



Photo credit: Homeland Security Today

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## EXPLOSIVITY HAZARDS — BLEVE CONTINUED

When a BLEVE occurs, debris may travel hundreds of feet, with tremendous force and the escaping fuel can ignite causing an expanding fireball.

Although most liquefied gas BLEVEs that involve container failure result from fire exposure, a few BLEVEs have occurred due to container failures from other causes such as corrosion or impact from an outside force.

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## EXPLOSIVITY HAZARDS — BLEVE CONTINUED

When inspecting a household hazardous waste facility, grill propane tanks will be observed. While it can be extremely rare, these propane tanks can become BLEVEs.

While propane tanks are generally safe. With the heat extremes in Florida, the possibility of a BLEVE occurring, while rare, can happen.

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## BLEVE EXAMPLE – T2 LABORATORIES

On Dec. 19, 2007, a powerful explosion and subsequent chemical fire killed four employees, injured 32 people and destroyed T2 Laboratories, Inc. (T2) in Jacksonville, Florida. The incident occurred while T2 was producing its 175th batch of methylcyclopentadienyl manganese tricarbonyl (MCMT).

### T2 Laboratories Accident

**Before**



**After**



Photo credit: Slideserve

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## BLEVE EXAMPLE – T2 LABORATORIES CONTINUED

The resulting BLEVE spread debris up to 1 mile from the plant.

Four T2 employees died of blunt force trauma, as a result of the explosion.

The blast damaged 32 structures within 1,700 feet from T2.

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## BLEVE EXAMPLE – T2 LABORATORIES CONTINUED

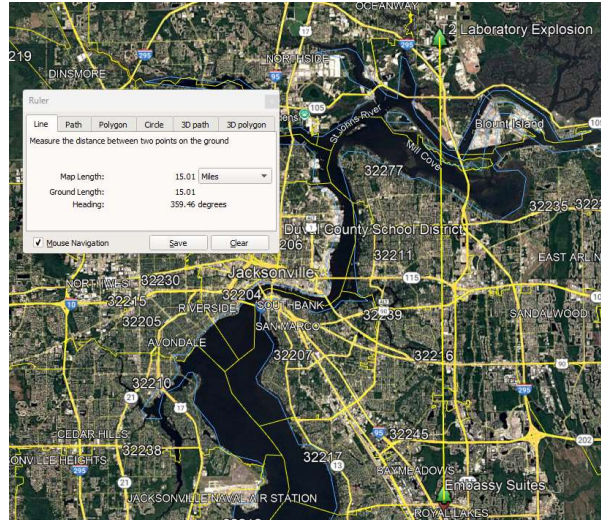


Photo credit: Google Earth

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## BLEVE EXAMPLE – T2 LABORATORIES CONTINUED

Additional resources detailing the T2 Laboratories explosion:

- T2 Laboratories explosion and fire:  
<https://youtu.be/o3eQU25Nesk>
  - Occurred approximately 15 miles north of this hotel.
- Runaway explosion at T2 Laboratories:  
<https://youtu.be/C561PCq5E1g>

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## CORROSION HAZARDS

Corrosion hazards are chemicals that cause the electrochemical degradation of metals or alloys or the destruction of body tissue.



Photo credit: KGS Steel, Inc.



Photo credit: Helix Solutions

\*These are DEP's general safety considerations.

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## pH SCALE

The pH scale is a logarithmic scale, where the strength increases by a factor of 10 for each increment from 7.0 (neutral):

- An increase from 0 to 1 is a factor of 10.
- An increase from 0 to 2 is a factor of 100.

Environmental Effects	pH Value	Examples
ACIDIC	pH = 0	Battery acid
	pH = 1	Sulfuric acid
	pH = 2	Lemon juice, Vinegar
	pH = 3	Orange juice, Soda
All fish die (4.2)	pH = 4	Acid rain (4.2-4.4) Acidic lake (4.5)
	pH = 5	Bananas (5.0-5.3) Clean rain (5.6)
Frog eggs, tadpoles, crayfish, and mayflies die (5.5)	pH = 6	Healthy lake (6.5)
		Milk (6.5-6.8)
Rainbow trout begin to die (6.0)	pH = 7	Pure water
	pH = 8	Sea water, Eggs
NEUTRAL	pH = 9	Baking soda
	pH = 10	Milk of Magnesia
	pH = 11	Ammonia
	pH = 12	Soapy water
	pH = 13	Bleach
	pH = 14	Liquid drain cleaner
BASIC		

Photo credit: United States Geological Survey

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## WHEN ON-SITE RED FLAGS

The following can be considered “red flags” that can alert you to possible dangers:

- Warning Labels.
- Strong Chemical Odors.
- Prohibited Waste:
  - May be an “indicator” of other, possibly harmful wastes.

\*These are DEP’s general safety considerations.

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## SUMMARY

- Do your homework and know what to expect at the site.
- Scan for hazards **before** you enter the facility.
- Wear the appropriate PPE (better to have it and not need it, than to need it and not have it).
- Don’t touch anything unless absolutely must. If you do, **wear gloves.**
- Don’t lift or open anything.
- Ask questions if you aren’t sure about something.
- Leave dangerous areas if there is the potential for exposure or a health/safety risk is present.

\*These are DEP’s general safety considerations.

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# THANK YOU

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