

**Safety
Talk**

Propane Industry Safety Talks

Bulk Propane Delivery and Transfer



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This document includes *Safety Talks* relevant to *Bulk Propane Delivery and Transfer*. A comprehensive set of all 45 *Safety Talks* is also available.

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Safety Talk

Using Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) plays an important role in ensuring your safety when handling propane. While OSHA sets out certain employer requirements, it is your responsibility to know which PPE is required for specific tasks, how to use it appropriately, and secure it for your assignment. Always follow manufacturer and employer guidelines on the equipment's purpose, limitations, proper fit, and maintenance.

COMMON PPE AND TYPICAL USES INCLUDE:

- Head and face protection, including face shields, protective goggles, and hard hats** — used for welding, chipping, grinding, drilling, or using air-powered tools for breaking concrete or hard surfaces. Goggles are also required for dispensing propane or repairing tanks, as leaking gas can be harmful to eyes. Hard hats are necessary during tank installations/moves or when working in crawl spaces or other small areas where irregular structures can cause head cuts or bruises.
- Earplugs** — required any time steady or impulse noise levels are higher than 85 decibels, such as when using jackhammers. See your company's measures and guidelines.
- Respirators** — vital in removing harmful substances from the air or supplying breathable, clean air. Consult relevant Safety Data Sheets (SDSs), your company's procedures, or your supervisor for which type of respirator to use with your specific task.
- Hands, arms, and feet protection, including gloves and work boots** — required when dispensing or transferring propane, moving tanks or cylinders, handling pipes, or cutting or welding.

Depending on your work area or job function, your employer may require additional protection. If you are unsure of the proper PPE to use for a particular task, ask your supervisor.

SECURING, USING, AND MAINTAINING PPE:

- It is the job of everyone at your site to clean, store, and maintain PPE properly so that it is readily available when needed. Follow your employer's guidelines.
- Remove and report any damaged, cracked, or otherwise compromised PPE to your supervisor immediately, and request replacement.
- Check and follow manufacturer and employer protocols for cleaning and repairing PPE.
- Your safety is top priority. Advise your supervisor if you believe additional PPE is required or helpful for a particular task.

Discussion Topics

1. Whose responsibility is it to ensure you have the correct PPE for your job?
2. What should you do if you arrive at a job site and no PPE is available?
3. Is it acceptable to use PPE that is in poor condition if it is the only available PPE on site?

LEARNING ACTIVITY

Set up a number of scenarios where PPE is necessary. Have participants explain which PPE is necessary for which tasks and why.

Source: *Basic Principles and Practices of Propane* (PERC)

For more information about using personal protective equipment, visit propanesafety.com.



Safety Talk

Using and Maintaining Fire Extinguishers

Because propane is flammable, fire extinguishers must be available at all facilities and on all vehicles. They can keep a small incident from becoming a major accident. It is important that all workers and operators understand how to maintain and use fire extinguishers, in the event of a safety-related issue.

THINGS TO KNOW ABOUT FIRE EXTINGUISHERS:

- ✓ NFPA 58 requires at least one fire extinguisher be available at a bulk propane plant. Multiple extinguishers are a good idea in a large or spread-out facility.
- ✓ OSHA requires that employees be trained to use fire extinguishers when they are first hired and every year thereafter. Advise your supervisor if you are due for training.
- ✓ Fire extinguishers are vital for creating escape routes or for small fires, such as those involving combustible materials. They are not intended to put out a large blaze or propane fire.
- ✓ Make sure no propane leaks are present when using a fire extinguisher.

UNDERSTANDING FIRE EXTINGUISHER RATINGS:

- ✓ Fire extinguishers are rated by the NFPA by the class(es) of fire they are suitable for suppressing. Most extinguishers carry multiple ratings.
 - Type A: Paper, wood, or other similar fires
 - Type B: Flammable liquid or propane
 - Type C: Electrical
- ✓ Per NFPA 58, all propane delivery vehicles should carry one portable fire extinguisher having a minimum capacity of 18 lb. of dry chemical with a B:C rating. Check your local or state codes if they require a higher rating.

STORING, INSPECTING, AND MAINTAINING FIRE EXTINGUISHERS:

- ✓ Know the location(s), condition, and limitations of all fire extinguishers at your plant or on your vehicle.
- ✓ **Monthly Inspections** — Every propane facility must verify that fire extinguishers are intact and fully charged each month. Check with your supervisor for your site's schedule.
- ✓ **Annual Inspection** — Once a year, all units must be inspected by a fire inspection company or the fire department. These agencies will affix a special tag to the extinguisher, showing the test date.
- ✓ It is your job to frequently check the fire extinguisher in your work area or on your service vehicle. If the extinguisher is due for inspection, low on charge, damaged, or missing an inspection tag, notify your supervisor immediately.

Discussion Topics

1. You are ready to leave for a job site and notice that your vehicle's fire extinguisher is missing. How should you respond?
2. What could occur if you use a fire extinguisher not rated for the specific incident?

LEARNING ACTIVITY

Conduct a demonstration on the proper use of extinguishers for various types of fires. Cover specific suppression strategies applicable to paper, electrical, or propane incidents.

Source: *Basic Principles and Practices of Propane* (PERC)

For more information about using fire extinguishers, visit propanesafety.com.



Safety Talk

Basic Fire Prevention Rules and Procedures

Because propane is flammable, everyone involved in its handling must know and follow fire prevention and containment rules at all times. Your knowledge will help protect against property damage and ensure the safety of you and your customers.

RULES TO FOLLOW WHEN WORKING WITH PROPANE:

- ✓ Observe all fire prevention signs posted at the plant and warnings marked on containers with flammable material.
- ✓ Note the location of emergency shutdown controls and fire extinguishers at the plant and on the truck.
- ✓ Never block access to fire control equipment, including fire alarms, fire extinguishers, sliding fire doors, fire escapes, and sprinklers.
- ✓ Know how to use the fire extinguishers and inspect them frequently to verify they are properly sized, properly rated, and fully charged.
- ✓ Keep all ignition sources — including cigarettes and open flames — away from propane transfer areas. Never turn on or off any electrical switch in the area of a propane discharge. If power must be turned off to avoid a fire, turn it off from the circuit breaker in another location not affected by the discharge.
- ✓ Know the telephone number of the local fire department.
- ✓ Report any leak to your supervisor immediately.

STEPS TO FOLLOW WHEN A FIRE OCCURS:

In the unlikely event of a fire or an uncontrolled propane leak, remain calm and take the following steps, if it is safe to do so.

- ✓ If there is an emergency shutdown device, activate it.
- ✓ Immediately eliminate any sources of ignition.
- ✓ Evacuate the immediate area, contact the fire department, and do not re-enter until it has been determined safe. Move and stay upwind of a propane leak, fire, or vapor cloud.
- ✓ Shut off the electrical power at the main power source.
- ✓ If the fire involves a propane delivery vehicle on a highway, block off the roadway at least 2,500 feet in both directions from the accident.
- ✓ Contact your supervisor from a safe location. Do not approach the fire.
- ✓ Evacuate the area and wait for fire fighters to arrive.

Discussion Topics

1. How do you verify your plant's extinguishers are fully charged?
2. There is a fire at the plant and you left the area but realize you did not activate the emergency shutdown device. What should you do?

LEARNING ACTIVITY

Set up a situation with potential hazards (incorrect signs, missing fire extinguishers, etc.). Have participants identify problems and discuss what may occur if these issues are not remedied.

Source: *Propane Delivery Operations and Cylinder Delivery* [PERC]

For more information on fire prevention rules and procedures, visit propanesafety.com.



Safety Talk

Safe Driving Practices

Safe driving practices are a must for propane delivery drivers. Since your vehicle is larger and heavier than most other on-road vehicles — and you have a higher center of gravity — you need to know how to maintain vehicle control; drive safely; and manage accidents, breakdowns, or emergencies quickly.

DEFENSIVE DRIVING TIPS:

- ✓ Before setting out, note any issues with your route, surrounding area, or weather conditions. Schedule appointments with these in mind.
- ✓ Keep a safe following distance between you and the vehicle in front of you.
- ✓ Understand how to accommodate load and suspension shifts and manage skids.
- ✓ Check your blind spots often, keep your eye on other drivers by using your mirrors, and use your lights or horn as needed to make other drivers aware of your presence.
- ✓ Keep your vehicle well serviced to ensure proper tire pressure and condition.

BE COGNIZANT OF ROAD CONDITIONS:

Adverse weather and road conditions can be especially hazardous. Be alert and cautious as you manage your vehicle. When driving in poor conditions, remember to:

- ✓ Clean the vehicle's windows before heading out, and use your wipers and defroster as needed.
- ✓ Turn on your headlights and marker lights.
- ✓ Reduce speed, increase your following distance between vehicles, and pay close attention to other motorists.

ADDITIONAL WAYS TO REDUCE RISKS:

Combined with a high center of gravity, liquid surges and suspension shifts can cause changes in vehicle performance or loss of vehicle control, which could result in a rollover. To reduce risks:

- ✓ **Distribute the weight of cargo evenly.**
- ✓ **Monitor tire pressure and condition.** Excessive wear or improper inflation can increase risk. In the case of a blowout, steer your vehicle in a straight line, then reduce power and gradually brake as you steer out of traffic lanes.
- ✓ **Regain control of the vehicle before making any change in direction or speed.** Regain control of the vehicle before reducing speed, and then apply controlled braking. If possible, gradually maneuver completely off the road and onto the shoulder.
- ✓ **Compensate for blind spots.** Larger vehicle size and higher center of gravity result in blind spots to the sides and rear. Check mirrors frequently, use turn signals, and maintain proper lane location. Consider blind spots whenever backing the vehicle to ensure your cylinder delivery vehicle or bobtail will not strike anything.

Discussion Topics

1. Inclement weather is creating hazardous conditions in transit to a customer site. How should you handle this situation?
2. What should you do in the event of a tire blowout?

LEARNING ACTIVITY

Review the various sources available to propane drivers for gaining information on road and weather conditions. Discuss situations where it is safe to proceed to the next job site versus those that are not.

Source: *Propane Delivery Operations and Cylinder Delivery* [PERC]

For more information on safe driving practices, visit propanesafety.com.



Safety Talk

Selecting Safe Delivery Routes and Protecting Property

As a propane delivery driver, you are responsible for protecting people and property in the course of your job. The following tips can supplement your company's safety plan and help you prevent any unnecessary issues.

PLANNING AND SETTING OFF ON YOUR ROUTE:

- ✓ **Plan for the issues of delivery vehicles** — Know the height and weight of your vehicle and any bridges or road sections that require extra safety measures.
- ✓ **Drive with caution and vigilance** — Follow all recommended instructions at railroad crossings and drawbridges and posted hazmat route signs, and be prepared for any detours due to local restrictions.
- ✓ **Adjust for weather** — Maintain speed appropriate for conditions. Plan ahead if you need to change your route for easier travel, and make customer appointments accordingly.

Vehicle flashers must be used at all railroad crossings and any time the vehicle is stopped except for routine traffic stops.

PROTECTING CUSTOMER LANDSCAPING, PROPERTY, AND STRUCTURES:

You will encounter a variety of issues and obstacles in day-to-day deliveries and service. Understand the size and restrictions of your vehicle, and always exercise good judgment.

- ✓ Keep your vehicle on roadways, driveways, or surfaces adequate to support its weight.
- ✓ **Avoid attempting travel over small private bridges or culverts** — Park your vehicle and use a dolly to transport cylinders to the delivery location. If you're driving a bobtail, use the full length of the delivery hose to reach across the bridge to the LP-gas containers. Be aware of landscaping/decorative items that the hose may damage when pulling it to the container.
- ✓ Close all gates after driving through to prevent loss of pets or livestock. Park in a location that allows room for other vehicles to come and go freely.
- ✓ Stay alert to the activities and movement of children and pets.
- ✓ Upon job completion, conduct a vehicle walk-around to ensure your exit path is clear. Know the locations of telephone poles and utility boxes to confirm you can clear them.

Discussion Topics

1. The customer tells you other propane drivers have crossed his bridge without issue, but as you approach, you feel it might not be secure. What is your best course of action?
2. As you are exiting, you collide with an old birdhouse the customer has at her site. How do you proceed?

LEARNING ACTIVITY

Discuss a recent incident in a propane delivery or gas-related event. Discuss what was handled properly and what should have received more attention. Ask participants for input and suggestions.

Source: *Propane Delivery Operations and Cylinder Delivery* [PERC]

For more information on selecting safe delivery routes, visit propanesafety.com.



Safety Talk

Handling Vehicle Accidents and Emergencies

Accidents and emergencies that involve propane vehicles are particularly dangerous because of the chance of a hazardous material leak or fire. Hazards can also arise from fitting problems, overfilled containers, or transportation issues and may be detected en route. It is critical that propane drivers are prepared to handle these situations in an efficient and safe manner.

HANDLING ACCIDENTS OR ISSUES WITH NO PROPANE LEAK OR A CONTAINED LEAK:

- ✓ **Move the vehicle off the road and position it for safety** — Set the parking brake, shut down the engine, activate signal flashers, set the wheel stops*, check valves and containers for damage, and put out safety triangles to keep unauthorized people away from your vehicle.
- ✓ **Ensure safe conditions at the accident site** — Check for fuel spills or hazardous materials, then move and stay a safe distance away. Make sure no one is hurt and call your supervisor.

HANDLING ACCIDENTS OR ISSUES WITH A PROPANE LEAK:

- ✓ Stop, park your vehicle, and shut off your engine a safe distance from the road, other vehicles, and potential ignition sources.
- ✓ Use hazard warning signal flashers and warning triangles. However, flashers should be considered as a possible source of ignition.
- ✓ Immediately exit the vehicle, take your documents with you, and get your fire extinguisher as a preventive measure to contain non-propane fires.
- ✓ Determine if anyone is injured, and assist them if you are qualified to do so.
- ✓ Move up-wind of a leak or vapor cloud, and only activate emergency shutdown devices away from the leak if it is safe to do so. Do not pass through an area with a leak or vapor cloud.
- ✓ Call your supervisor from a safe location to report the incident. Your supervisor will make the determination whether to call 911.
- ✓ Move and direct other people away from the area.

ADDITIONAL CONSIDERATIONS SPECIFIC TO YOUR VEHICLE:

With a cylinder delivery truck:

- ✓ Check the condition of the cylinders and their valves and make sure they are all still present. Also, look for any fuel spills.

With a bobtail:

- ✓ If involved in a rollover, exit if you are able to and it is safe to do so.
- ✓ You may not know the condition of the vehicle and may need to rely on emergency response personnel to assess and handle the situation. Do not move the vehicle on your own.

ADDRESSING NON-PROPANE FIRES:

- ✓ Stop your vehicle in a location away from highly populated areas or buildings, shut off the engine, exit the cab, and call the fire department.
- ✓ Use your fire extinguisher to contain small fires if it is safe to do so.
- ✓ One of the greatest risks of fire is caused by driving on a flat or soft tire. Never leave a smoking tire unattended.

All accidents must be detailed on your company's Accident Report Form and reported to the DOT.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Source: *Propane Delivery Operations and Cylinder Delivery* (PERC)

For additional information about handling accidents or emergencies, visit propanesafety.com.

Discussion Topics

1. While driving a cylinder delivery truck, you smell a faint odor of propane. How do you respond?
2. You have been in a collision, and you detect a strong propane smell but cannot detect the source. What steps should you take?

LEARNING ACTIVITY

Stage an imaginary accident involving a vehicle that has a propane leak. Discuss all potential hazards and talk participants through your company's safety actions.



Safety Talk

Entering and Exiting the Truck

As a propane delivery driver, you get in and out of your truck several times a day. While it is a routine procedure, many injuries in the propane industry occur while entering or exiting the vehicle, including twisted ankles, back strain, or even head injuries. The following rules and precautions will help you reduce your risks of injury.

WHEN GETTING INTO OR OUT OF THE CAB:

- ✓ **Keep three points of contact** — Put two hands and one foot or one hand and two feet on the vehicle at all times. This is called the “three-point rule.”
- ✓ **Face the truck** — Many injuries happen when drivers try to exit the truck without turning around. Jumping down or just stepping out without first turning toward the truck can result in significant injury.
- ✓ **Keep hands free while climbing** — If you are holding an object, put it down before entering or exiting the cab.
- ✓ **Check the ground** — Always check the ground and sides of the truck before you step down. Be careful to avoid any ice, loose debris, potholes, or other issues.
- ✓ **Caution on the last step** — Stay alert during the last move when you stop climbing down and start walking. This change in movement is a frequent cause of falls or slips.

WHEN CLIMBING ON OR OFF THE TRUCK BED:

The back of the truck does not always have the hand and foot holds to establish three good points of contact. Whenever possible, place the load back by the gate, where you can reach it without climbing in. If you must climb in the truck bed, use one of these options:

- ✓ Sit in the bed and turn.
- ✓ Use two hands and a knee.
- ✓ Climb up from the bed corner.

Make sure your grip and foot contacts are solid before making any moves. Exit the same way you entered. Never jump down from the truck bed.

QUICK TIPS ABOUT USING LIFT GATES:

Some propane trucks are equipped with service gates to move cylinders from the truck bed to the ground and back again. If you need to enter the truck bed:

- ✓ Follow your company’s policy regarding standing or riding on lift gates.
- ✓ As you maneuver around the lift gate, make sure the area where you place your feet is free from water, ice, debris, or anything that might cause a slip.
- ✓ Make sure to have an adequate grip and solid footing at all times.

Discussion Topics

1. What adjustments might you need to make when entering or exiting your vehicle in harsh weather conditions?
2. Your supervisor calls when you pull up just in time for a scheduled appointment. What procedures do you follow while taking a phone call as you exit the vehicle?

LEARNING ACTIVITY

Practice using the three-point rule when exiting a cab or climbing out of a truck bed on different types of vehicles.

Source: *Propane Personal Safety* (PERC)

For more information about entering and exiting propane vehicles safely, visit propanesafety.com.



Safety Talk

Vehicle Parking and Security

As a propane delivery driver, you must follow NFPA 58 and DOT regulations to ensure the safety and security of your vehicle. The following Safety Talk reinforces these rules, offering guidance on where to park, as well as practices to avoid theft, vandalism, abuse, or other issues.

WHEN PARKING INDOORS AT PUBLIC GARAGES OR BUILDINGS:

Before parking your vehicle in a public garage or other building, ensure that:

- All liquid propane is purged from the cargo tank, piping, pump, meter, hoses, and other equipment.
- All portable propane containers are removed from the vehicle.
- The vapor pressure in the piping, pump, meter, delivery hose, and related equipment is reduced to approximately zero.
- All valves are closed, and the delivery hose or valve outlets are plugged or capped.

WHEN PARKING INDOORS AT NON-PUBLIC BUILDINGS:

Before parking indoors at a non-public building — including a bulk plant — ensure that:

- The building is constructed in accordance with NFPA 58.
- The premises are under the control of the operator (owner) of the vehicle.
- Floor-level ventilation is provided in all parts of the building where vehicles are parked.
- Primary shutoff valves on the cargo tank and other containers are closed, and the delivery hose outlets are plugged or capped (except the engine fuel container).
- Propane containers have been gauged or weighed, no propane container will be located near a heat or ignition source, and no leaks are present.

WHEN PARKING OUTDOORS:

If your vehicle will be left unattended, such as while delivering propane, make sure that:

- It is not parked in congested areas.
- It is parked on a street adjacent to the service location and is transporting containers or cargo of 3,500 gallons water capacity or less. Stay at least 50 feet away from high-population buildings such as churches, schools, apartment buildings, or hospitals.
- It is not parked on or within five feet of the traveled portion of a public street or highway except for brief periods when the operation requires the vehicle to be parked and it is not practical to park the vehicle in any other place.

SECURITY ISSUES:

Every propane company is required to have its own detailed security plan to prevent theft, vandalism, product leaks, or fire. You can reduce potential hazards by:

- Staying with your vehicle at all times, except when performing job-related duties.
- Keeping a 100-foot, unobstructed view of your vehicle while making deliveries.
- Following your company's security and hazmat protocols, attending required security training, and understanding how to recognize and mitigate any security risks.

Source: *Propane Personal Safety* (PERC)

For more information about vehicle parking and security, visit propanesafety.com.

Discussion Topics

1. You arrive at a location late and are unable to find parking that complies with safety standards. How do you proceed?
2. Because of weather conditions, you need to park further out than usual. As you walk the route, you realize that you will not be able to see your vehicle while making the delivery. What should you do?

LEARNING ACTIVITY

Demonstrate how to prepare a vehicle for parking or storing in a garage. Discuss instances where it may and may not be safe to store a propane vehicle.



Safety Talk

Anhydrous Ammonia Properties and Hazards

Since some propane distributors transport both propane and anhydrous ammonia, there is the possibility of contamination of bulk propane containers. In addition to affecting propane's performance, such contamination can present safety risks. By understanding the characteristics and hazards of anhydrous ammonia, you can detect contamination and help avoid potential hazards.

PHYSICAL PROPERTIES OF ANHYDROUS AMMONIA

Anhydrous ammonia (or simply "ammonia") shares some of the same characteristics of propane, but has some notable differences to help in its detection.

- ✓ Anhydrous ammonia is a compound of nitrogen and hydrogen. Similar to propane, it is a colorless gas with a characteristic pungent odor.
- ✓ At room temperature and atmospheric pressure, anhydrous ammonia is lighter than air, whereas propane is heavier than air.
- ✓ Compressed and cooled, anhydrous ammonia is a colorless liquid and is lighter than water.
- ✓ At atmospheric pressure, its boiling point is -28°F versus -44°F for propane.
- ✓ In a closed, pressurized container, anhydrous ammonia is stored and transported as a liquid, and vaporizes when depressurized.

HAZARDS OF ANHYDROUS AMMONIA

- ✓ Anhydrous ammonia is both caustic and hazardous.
- ✓ Anhydrous ammonia is an inhalation hazard. At certain concentrations, exposure to anhydrous ammonia can disable or suffocate you.
- ✓ Direct contact with your skin or eyes can cause frostbite, burns, or blindness.
- ✓ Under certain conditions, it is flammable, chemically reactive, and potentially explosive.
- ✓ Anhydrous ammonia is corrosive to brass, copper, and their alloys. Exposure to anhydrous ammonia causes a blue-green corrosion on the brass portion of the container valve.
- ✓ Anhydrous ammonia weakens brass valves on propane containers, which can cause cracks and product leakage. Such damage can lead to violent, unexpected expulsion of the valve and cause serious injury or even death.

Always use appropriate PPE and handling procedures when working around ammonia. Make sure you are familiar with the most current Safety Data Sheet and your plant's safety protocols and know how to respond in the event of a spill or accidental exposure.

Discussion Topics

1. How do anhydrous ammonia properties differ from those of propane? Why is it important to understand these differences?
2. What kinds of PPE should be used when handling anhydrous ammonia?

LEARNING ACTIVITY

Using pictures, online resources, or actual propane containers, if available, have participants identify damage and corrosion caused by anhydrous ammonia versus other sources.

Source: *Basic Plant Operations* [PERC]

For more information about anhydrous ammonia properties and hazards, visit propanesafety.com.



Safety Talk

Recognizing and Testing for Anhydrous Ammonia

Because of the safety hazards posed by anhydrous ammonia, propane workers should be trained and cognizant of how to detect anhydrous ammonia contamination at both the bulk plant and in portable containers. The tips below will help supplement your knowledge and ability to test for, detect, and address issues.

RECOGNIZING AND TESTING FOR CONTAMINATION IN PORTABLE CONTAINERS:

- ✓ **Odor or visual evidence.** You can recognize anhydrous ammonia contamination by its smell or by evidence of a blue-green corrosion on brass or copper fittings. If either of these signs are present, stop your activity, isolate the container, and alert your supervisor.
- ✓ **History of contamination or suspect circumstances.** If no visible signs exist, but there is reason to believe there may be an ammonia issue, perform a *litmus test* (see below) to determine whether that the tank is contaminated.

Contaminated containers are often purged with water in an effort to remedy. Even if this occurs, ammonia vapor may still remain. It is important to test all returning containers for evidence of such vapor, as it could damage a propane system's copper and brass components.

RECOGNIZING AND TESTING FOR CONTAMINATION IN BULK TANKS:

The best ways to recognize possible contamination in bulk storage tanks is by odor or evidence of corrosion. However, since corrosion may take time, it is important to also:

- ✓ Perform a litmus test (see below) to confirm that the tank is contaminated.
- ✓ Stop activities, isolate the container, and alert your supervisor.
- ✓ Follow your company's guidelines about what to do with the potentially affected container.

If a litmus test is positive for ammonia, stop all deliveries, secure the tank, and consult with your supervisor for the best approach to remedy.

STEPS FOR PERFORMING A LITMUS TEST:

- ✓ Obtain a bottle of distilled water; clean tweezers; a clean, dry cloth; and a package of red litmus paper.
- ✓ Remove work gloves, as they could affect litmus readings and invalidate the test.
- ✓ Clean and wipe the tweezers with the water and dry cloth.
- ✓ Remove one piece of litmus paper from the package using the tweezers. Do not allow the litmus paper to touch anything.
- ✓ Carefully soak the litmus paper with distilled water.
- ✓ Open any valve that is in the vapor space such as the service valve or fixed maximum liquid level gauge.
- ✓ Hold the paper directly in the stream of propane vapor for at least 30 seconds.

If the litmus paper remains red, verify that your company's policies allow the container to be put back into service. If the litmus paper turns blue, the propane may be contaminated with anhydrous ammonia. Notify your supervisor and follow your company's safety protocols.

Discussion Topics

1. As you unload cylinders at a site, you notice bluish discoloration around the fittings, but are unsure if it is corrosion. The customer has expressed need for immediate propane delivery. How do you respond?
2. The results of a litmus test on a propane container are inconclusive. What should be your next steps?

LEARNING ACTIVITY

Walk participants through the process of performing a litmus test. Discuss your company's specific procedures for testing for ammonia and for handling potentially contaminated tanks.

Source: *Basic Plant Operations* (PERC)

For more information about recognizing and testing for anhydrous ammonia, visit propanesafety.com.



Safety Talk

Bulk Propane Delivery

Delivering bulk propane to a customer location is a common task, but conditions and equipment can pose some challenges. The following guidelines will help you avoid personal injury and ensure safe, efficient bulk propane delivery.

TO SAFELY DELIVER BULK PROPANE:

- ✓ **Use three points of contact** — Park and position the bobtail and exit using three points of contact. Make sure you are facing the truck cab when doing so.
- ✓ **Set the wheel stops*** — To avoid unnecessary back strain, support your upper body with one hand on your knee as you position the wheel stops.
- ✓ **Check your path of travel for obstacles or issues** — The area from the truck to the tank may have easy-to-spot obstacles such as toys or a bicycle. But there could be other hazards hidden in the grass or under snow or ice. Always walk the path first to make sure it's clear before pulling out the hose.
- ✓ **Ensure the hose and reel are in good working condition** — Before you set out, check the propane hose and components, and make any necessary repairs or adjustments. If the reel needs lubrication or the hose is binding, moving the hose on the job will be more difficult.
- ✓ **Put the hose over your shoulder and hold it with both hands** — Be careful to avoid strain to your shoulders and lower back. Carrying the hose under your arm or pulling the hose with your arm extended behind you can cause serious injury.
- ✓ **Avoid pointing the nozzle at any part of your body** — Always take measures to ensure you do not come into contact with liquid propane or vapors.
- ✓ **Keep your body facing forward with your shoulders over your hips** — Twisting your back while walking can result in injury.
- ✓ **Switch shoulders to balance the work across muscle groups and reduce overall stress on your body** — While you do your initial walk, plan your most efficient route. For longer paths, switch shoulders or move the hose in two stages.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Discussion Topics

1. Why is it important to walk the path to the tank before pulling out the hose?
2. As you prepare to fill your customer's tank, you find the hose is not unreeling properly. How should you proceed?

LEARNING ACTIVITY

Set up a bobtail at your site and have participants practice moving the hose from truck to "tank" then back again, using these guidelines. Discuss body mechanics that could reduce the potential for injury.

Source: *Propane Personal Safety* (PERC)

For more information about bulk propane delivery, visit propanesafety.com.



Safety Talk

Cargo Tank Motor Vehicle (CTMV) Emergency Shutdown Systems and Bulkhead Components

Propane workers who operate CTMVs need to understand their equipment in order to maintain high safety standards. This Safety Talk covers components and systems that are essential in unloading operations.

BULKHEAD COMPONENTS

A bulkhead may be used for both loading and unloading, or be designated for unloading only. In either case, the bulkhead includes:

- ✓ One or more liquid connections.
- ✓ One or more vapor connections used for pressure equalization.
- ✓ A breakaway system on each connection to protect the piping system. Located just above the top of a stanchion, this system allows a safe breakaway, in the event of a propane overflow or accidental vehicle pullaway.

Bobtails offer different equipment and specifications than CTMVs. The pneumatic line, backflow check valve, and excess flow valve of a CTMV will close propane valves and protect facilities and personnel in an emergency situation. Specific liquid and vapor connections need to be considered for their applicability and safety in each situation.

EMERGENCY SHUTDOWN SYSTEMS

Every CTMV is required to have an emergency activation system that, when activated, stops the flow of propane and in some cases stops the engine. These systems consist of:

- ✓ A metered delivery service with a system that automatically stops the flow of propane and shuts down the engine after five minutes unless the operator uses a handheld remote unit to respond to a query issued by the system.
- ✓ A metered delivery service that has a passive emergency shutdown system that automatically stops the flow of propane within 20 seconds without human intervention in the event of a complete delivery hose break.
- ✓ A device that otherwise manually stops the flow of propane and shuts down the engine.

Emergency shutdown systems are essential, in that they provide for needed backup support to turn off the flow of any propane and confirm no gas release or power can pose unnecessary hazard.

Discussion Topic

1. Discuss components of the bulkhead and emergency systems and make sure participants understand how each element functions and what risks are possible if any component is compromised.

LEARNING ACTIVITY

Show participants all the elements of a CTMV's emergency shutdown system and make sure they are comfortable with all relevant procedures.

Source: *Basic Plant Operations* [PERC]

For more information about bulkhead components and emergency shutdown systems, visit propanesafety.com.



Safety Talk

Hazards and Precautions for Propane Transfers

When working with propane, safety is paramount. The risks and precautions that apply to basic operations, such as filling and transporting cylinders, also apply to other activities. The tips below serve as a reminder of what to be aware of and precautions to follow during all propane transfers.

SAFETY TIPS FOR ALL PROPANE TRANSFERS:

- ✓ Remove all ignition sources, flammable liquids, and combustible materials to a safe distance away from the transfer area.
- ✓ Observe all precautions that apply within the Static Discharge Control Area.
- ✓ Always wear appropriate PPE.
- ✓ Inspect hoses and fittings before making connections. Correct any deficiencies and replace damaged components before proceeding.
- ✓ Avoid dragging hoses across the ground when making connections.
- ✓ Carry valves by the body. Carrying by the handwheel or operating lever can accidentally open the valve. Aim the valve outlet away from yourself and other people.
- ✓ Know the locations and operating procedures for emergency shutoff valves.
- ✓ Know your plant's emergency evacuation procedures, and check that gates are open to provide adequate egress locations in case of emergency.
- ✓ Take special care when unloading into multiple storage tanks simultaneously. Refer to your plant's procedures to determine which liquid and vapor valves should be open and closed, and how to monitor tank levels during the transfer.
- ✓ Per DOT regulations, make sure a "qualified person" is present during every transfer operation. This person is someone who has been trained on safe work practices, health and safety hazards of propane, and emergency response procedures.
- ✓ In the case of an equipment malfunction that cannot be fixed easily, secure the component if it is safe to do so, and follow your company's policies and procedures. In some cases, you may need to apply a lock and tag to protect people nearby and prevent any issue.

Discussion Topics

1. As you prepare to fill cylinders on a very busy day, you notice that another employee is working in an area with equipment that blocks the exit. How do you proceed?
2. Why is it important to have a qualified person in attendance during propane transfers?

LEARNING ACTIVITY

Stage a common workday scenario or use an illustration with several issues that need to be addressed. Have participants identify hazards and discuss how to remedy.

Source: *Basic Plant Operations* [PERC]

For more information about hazards and precautions for propane transfers, visit propanesafety.com.



Safety Talk

Determining the Amount of Propane to be Unloaded from a Cargo Tank Motor Vehicle (CTMV)

Before unloading a CTMV, you must verify that there is sufficient space in the bulk storage tanks to hold the CTMV's contents. There are two major steps you need to take: verify the CTMV's contents and determine available storage tank capacity.

VERIFYING THE CONTENTS OF A CARGO TANK:

- ✓ Check the bill of lading to ensure the cargo tank contains propane. If the bill of lading states otherwise, or if the tank is not clearly marked PROPANE or LP-GAS, notify your supervisor.
- ✓ Verify the presence of odorant using a sniff test or other means, and document the results as dictated by your company policy.
- ✓ Check the temperature and pressure readings to make sure the load is not contaminated.
- ✓ Record the % liquid volume in the cargo tank.
- ✓ Multiply the % liquid volume by the water capacity in gallons to determine the gallons of liquid propane in the cargo tank. *For example, if the liquid level in a 10,000-gallon cargo transport tank reads 80%, the tank contains 8,000 gallons of liquid propane.*

DETERMINING THE AVAILABLE STORAGE TANK CAPACITY:

- ✓ Refer to your company policy to determine the maximum permitted filling level (MPFL) in percent for each available storage tank.
- ✓ Calculate the number of gallons of liquid propane that can be added to each tank (% available capacity) by subtracting the % liquid volume from the MPFL.
 Example: with MPFL = 80%, current capacity = 69%
 $\% \text{ available capacity} = 80\% - 69\% = 11\%$
- ✓ Multiply the % available capacity by the water capacity (WC) in gallons to obtain the gallons that can be added to the storage tank. $\text{Gallons available capacity} = \% \text{ available capacity} \times \text{WC in gallons}$.
 Example: using a 30,000-gallon bulk storage tank available capacity of 11%
 $11\% \times 30,000 \text{ gallons} = 3,300 \text{ gallons}$
- ✓ Once you have determined available capacity for each storage tank, you can proceed to add the specified gallons of propane to all the available storage tanks. Make sure the total available capacity is greater than the gallons of propane in the cargo tank. Do not exceed MPFL limits.

If the volume in the cargo tank exceeds the total capacity available in the storage tanks, notify your supervisor.

Discussion Topics

1. You are ready to unload a CTMV and cannot locate information on the storage tank's MPFL. How should you proceed?
2. Why is it important not to exceed MPFL limits?

LEARNING ACTIVITY

Have participants do three calculations for determining available storage tank capacity with different liquid volume values.

Source: *Basic Plant Operations* [PERC]

For more information about unloading propane from CTMVs, visit propanesafety.com.



Safety Talk

Unloading a Bobtail Using a Bobtail Pump

Bobtails have different components than other bulk delivery vehicles. By familiarizing yourself with the following steps, you can ensure the safe unloading of a bobtail.

POSITION THE BOBTAIL FOR THE UNLOADING PROCESS:

As you park the bobtail, position it so that:

- ✓ Both level gauges (bobtail and receiving container) are visible.
- ✓ Shutoff valves on both the bobtail and the receiving container are readily accessible.
- ✓ The bobtail is least 10 feet from the receiving container.
- ✓ Once positioned, turn off all electrical devices, set the parking brake, and use your wheel stops* to prevent unintended movement.

CONNECT THE HOSES AND CHECK FOR LEAKS:

- ✓ Attach the bobtail hose-end valve to the bulkhead connection with an adapter OR connect the bobtail hose-end valve to the bulkhead hose-end valve with an adapter, depending on the bulkhead configuration.
- ✓ Ensure vapor equalization by connecting the bulkhead hose with the hose-end valve to the bobtail vapor connection. This will minimize wear and tear on the transfer pump and avoid unnecessary slowdown.
- ✓ Open the bulkhead valves and check connections for leaks. Signs of a leak may include the persistent odor of propane, liquid escaping as white mist, or vapor that looks like hot air rising from hot blacktop.
- ✓ If a potential leak exists, close the bulkhead valves, tighten the connections, replace damaged seals, and/or replace the adapter. If the leak persists, do not unload your bobtail and contact your supervisor.

START THE TRANSFER:

- ✓ If unloading using metered delivery service, set the meter.
- ✓ Open the bobtail discharge valves including the hose-end valve and the internal valve. Open the last valve slowly to avoid slugging an excess flow valve.
- ✓ Engage the power takeoff (PTO), set the engine RPM to the proper speed, and begin pumping. Do not start the pump until the liquid line is open.
- ✓ Monitor storage tank levels throughout the transfer to ensure against leaks or overfilling.

END THE TRANSFER:

Stop the bobtail pump when one of the following occurs:

- ✓ All storage tanks reach maximum permitted filling level (MPFL).
- ✓ The cargo tank reaches empty.

Complete the process by closing all liquid and vapor valves on the bulkhead and the cargo tank. Bleed down and disconnect the liquid hose carefully.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Source: *Basic Plant Operations* (PERC)

For more information about unloading a bobtail, visit propanesafety.com.

Discussion Topics

1. As you are about to unload a bobtail truck, you realize that it is only six feet away from the storage container. How should you handle this situation?
2. In what situations is it okay to proceed if you believe a potential leak at the connections exists?

LEARNING ACTIVITY

Practice the process of unloading a bobtail. Supervise participants in the connection, transfer, and completion, identifying problems that can occur at various stages. Review your company's procedures for addressing such issues.