# Safety Measures For Propane-Fueled Forklifts

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*Appropriate training and safety measures will best serve next generation of operators.*

There are more than 600,000 propane-fueled forklifts operating today in manufacturing plants, warehouses, and distribution centers across the United States, and it's not hard to understand why. Propane-fueled forklifts maintain consistent, 100 percent power throughout operation and offer ground speed advantages greater than other energy sources. What's more, the December 2010 passage of the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 included a propane fuel tax credit of 50 cents per gallon through Dec. 31, 2011[1].

With many experienced forklift operators nearing retirement, it's important manufacturing plant ownership and management adequately prepare the next generation. That's especially true regarding refueling propane-fueled forklifts.

While exchanging an empty propane cylinder for a full replacement isn't difficult, as the steps outlined in this article illustrate, those steps should never be considered a substitute for forklift manufacturer operator safety training courses and applicable standards. The latter includes, but is not limited to, Occupational Health and Safety

Administration (OSHA) Standard 1910.178 and American National Standards Institute/Industrial Truck Standards Development Foundation (ANSI/ITSDF) Standard B56.1-2009[2].

**Getting Started**

According to OSHA[3], propane fuels several forklift classes, including:

- **Class IV:** Internal Combustion Engine Trucks with Solid/Cushion Tires
- **Class V:** Internal Combustion Engine Trucks with Pneumatic Tires

The good news for less-experienced forklift operators is that there are no procedural differences to remember between these classes when conducting a propane cylinder exchange.

According to both the Propane Education & Research Council PERC[4] and the Railroad Commission of Texas, that exchange should always be conducted by appropriately trained personnel using proper safety procedures[5]. Personnel that have not been appropriately trained should never attempt to exchange a propane cylinder, and must defer to co-workers with appropriate training.

Appropriately trained personnel should use personal protective equipment (PPE) when exchanging propane cylinders: proper gloves, since contact with liquid propane can cause frostbite, and eye protection, like safety glasses. Forklift manufacturers[6] also recommend reviewing the forklift operator's manual for any manufacture or model-specific information or tips before handling or changing propane cylinders.

**Empty Cylinder Removal**

PERC and the Railroad Commission of Texas recommend the following procedure to remove an empty cylinder from a forklift[7]:

- Park the forklift in a designated safe area, turn off the engine, and engage the parking brake.
- Close the propane cylinder's service valve by turning it clockwise.
- Disconnect the female quick-connect fitting from the male quick-connect fitting by turning it counter-clockwise.
- Disconnect the toggle clamp that secures the cylinder to the forklift.
- Using proper lifting techniques, remove the cylinder from the forklift.

**Inspecting The Replacement Cylinder**

Inspecting a full propane cylinder after its removal from the facility's cage, typically installed by a propane provider, will help ensure good working use. Forklift manufacturers[8] typically recommend the following steps:

- Look for rusting, dents, or gouges on the cylinder.
- Inspect for leaks three ways:

    - **Smell:** A distinct odor is added to propane during its manufacturing process.
    - **Sound:** A hissing noise may indicate propane is escaping.
    - **Sight:** Frost can sometimes be seen in the area of a leak. Also, if an operator suspects a leak but can't locate it, a soap-and-water mixture can be applied, which produces bubbles at the leak point.
- Ensure the pressure relief valve fitting is approximately 180 degrees from the forklift's locating pin, and is secure.
- Check the liquid service valve for defects.
- Verify the filler valve dust cap is in place.

**Replacement Cylinder Installation**

PERC and the Railroad Commission of Texas recommend the following replacement cylinder installation procedure[9]:

- Using proper lifting techniques, lift and place the cylinder on the forklift. Ensure the forklift's locating pin is properly inserted through the locating pin hole on the cylinder's collar.
- Reconnect the toggle clamp, ensuring the cylinder is properly secured.
- Verify the propane hose is not chafed or cut, and the gasket/O-ring is properly installed in the male quick-connect fitting, and then connect and tighten the male and female quick-connect fittings.
- Slowly open the liquid service valve by turning it counter-clockwise, and check for leaks.
- Ensure the propane hose and cylinder don't extend beyond the forklift's rear or sides.
- Confirm the cylinder is properly secured against movement or displacement.
- Start the forklift's engine and resume work.

Keep in mind that if a forklift's locating pin is broken, the cylinder can be mounted in any position. This could falsely indicate an empty cylinder, among other problems, so the forklift should be removed from service immediately.

**Appropriate Training Is Key**

With manufacturing plant ownership and management identifying the next generation of forklift operators, it's crucial that appropriate training and safety are addressed as part of that process. Since propane-fueled forklifts are heavily used in manufacturing plants, that's especially true with regard to propane cylinder exchange.

The steps listed above are a basic outline of the cylinder exchange process; further training is necessary to acquire the knowledge to safely exchange a forklift propane cylinder. Reviewing a manufacturer's current forklift operator safety training courses and materials, along with standards like OSHA 1910.178 and ANSI/ITSDF B56.1-2009, will help ensure appropriate training and safety measures are in place.

*The Propane Education & Research Council was authorized by the U.S. Congress with the passage of Public Law 104-284, the Propane Education and Research Act*

*(PERA), signed into law on October 11, 1996. The mission of the Propane Education & Research Council is to promote the safe, efficient use of odorized propane gas as a preferred energy source through research and development, training, and safety initiatives.*

***References***

1 Forklift operators should consult their tax advisor regarding claims for credits or refunds.
2 Industrial Truck Standards Development Foundation, "B56 Standards [1]," (Accessed Sept. 7, 2011)
3 Occupational Health and Safety, "Powered Industrial Trucks [2] (Forklifts)," (Accessed Sept. 7, 2011)
4 Propane Education & Research Council, "Dispensing Propane Safely [3]," (Accessed Sept. 7, 2011)
5 Railroad Commission of Texas, "Changing and Filling Forklift Cylinders: Propane Safety Meeting Outline [4]." (Accessed Sept. 7, 2011)
6 Propane-fueled forklift refueling safety information contributed by Toyota Material Handling U.S.A. was reviewed for this portion of this article. For more information, visit http://www.toyotaforklift.com/ [5].
7 Railroad Commission of Texas, "Changing and Filling Forklift Cylinders: Propane Safety Meeting Outline [4]." (Accessed Sept. 7, 2011)
8 Propane-fueled forklift refueling safety information contributed by Toyota Material Handling U.S.A. was reviewed for this portion of this article. For more information, visit http://www.toyotaforklift.com/ [5].
9 Railroad Commission of Texas, "Changing and Filling Forklift Cylinders: Propane Safety Meeting Outline [4]." (Accessed Sept. 7, 2011)

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[1] http://www.itsdf.org/pB56.asp
[2] http://www.osha.gov/dcsp/products/etools/pit/forklift/types/classes.html
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[4] http://www.propane.tx.gov/training/marketersafetymeeting/Changing%20and%20filling%20forklift%20cylinders%2012-07.pdf
[5] http://www.toyotaforklift.com/