

WORKPLACE SOLUTIONS

From the National Institute for Occupational Safety and Health

Conducting a Daily Inspection of Powered Industrial Trucks (Forklift, Narrow-Aisle Reach Truck, Walkie Pallet Lift, and Tow Tractor/Tug)

Summary

Workers use powered industrial trucks (PITs) to move or lift materials in warehouses, retail, manufacturing facilities, dockyards, and construction sites. The Occupational Safety and Health Administration (OSHA) standard 29 CFR § 1910.178^{*} details the safety requirements for PITs. The requirements of 29 CFR § 1910.178 are applicable to general industry workplaces[†]. However, the information and recommendations in this Workplace Solutions document can be useful for construction, agricultural, long-shore, maritime, and mining workplaces as well. Section (q)(7) of the OSHA standard requires a daily examination (inspection) of PITs before they are placed in service, or after each shift for vehicles used on a round-the-clock basis. Employers must provide PIT operators with adequate training to properly con-

^{*}Code of Federal Regulations. See CFR in References.

[†]OSHA uses the term “general industry” to refer to all industries not included in agriculture, construction or maritime.

duct a PIT inspection. The National Institute for Occupational Safety and Health (NIOSH) developed this Workplace Solutions document to provide information about conducting a thorough daily inspection of a forklift/sit-down rider, consistent with 29 CFR § 1910.178 (q)(7), to reduce the likelihood of worker injuries during the use of PITs.

Introduction

PITs are powered by electric (battery) or internal combustion engines (diesel, gas, or liquefied petroleum gas [LPG]). In addition to forklifts, narrow-aisle reach trucks, walkie pallet lifts, and tow tractor/tugs, there are many other variations of PITs [OSHA n.d.]. Some examples include the following[‡]:

- Sit-down riders
- Narrow-aisle order pickers
- Narrow-aisle high-lift straddles
- Narrow-aisle side-loader platforms

[‡]With the increase in ecommerce, narrow-aisle reach trucks and narrow-aisle order pickers are becoming more common in warehouses.

- Narrow-aisle side-loader high-lift platforms
- Narrow-aisle turrets
- Narrow-aisle low-lift platforms
- Stacker pallets
- Walkie platform low lifts
- Walkie-pallet low lifts
- Walkie-pallet high lifts
- Tractor/walkie riders, and electric pallet jacks

OSHA standard 29 CFR § 1910.178 (q)(7) specifies that PITs must not be placed in service if the inspection shows any conditions adversely affecting the safety of the vehicle. In addition, all defects must be reported immediately and corrected before the vehicle can return to service. Section (l)(3)(i)(J) of the OSHA standard requires employers to provide PIT operators with the training[§] needed to perform an inspection of the PIT. NIOSH investigations of forklift-related fatalities indicate that

[§]Training must consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace [29 CFR 1910.178(l)(2)(ii)].



Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

many workers are not following the procedures established by OSHA standards, consensus standards, or equipment manufacturers' guidelines [NIOSH 2001; NIOSH 2020; Bobick et al. 2020]. This document provides step-by-step, comprehensive information to perform a thorough inspection of a PIT/forklift/sit-down rider (internal combustion, electric, or liquefied petroleum gas [LPG]) consistent with 29 CFR § 1910.178 (q)(7).

Description of Exposure

Numerous hazards are associated with operating or working near PITs. Between 2011 and 2019, the Census of Fatal Occupational Injuries (CFOI) of the Bureau of Labor Statistics (BLS) reported 630 deaths related to PITs including forklifts, order pickers, and platform trucks [BLS 2019]. Daily PIT inspections must be properly performed to identify, report, and correct defects. Otherwise, overturns, hazardous spills, and worker injuries and deaths could result from incidents involving correctable issues such as faulty seatbelts, LP gas tank leaks, leaks involving fuel or oil, low tire pressure/cracking, frayed electrical wires, and inoperable backup alarms and horns.

Recommendations

OSHA requires employers to provide PIT operators with adequate training⁴ to perform an inspection of the PIT. This document may assist employers who provide inspection training to PIT operators. The daily inspection process assists in identifying problems with the PIT that could cause an incident and endanger workers. In cooperation with the Industrial Truck Association, OSHA has provided general checklists for conducting a daily, pre-shift inspection of many different types of PITs:

Sample Daily Checklists for Powered Industrial Trucks | Occupational Safety and Health Administration ([osha.gov](https://www.osha.gov))

Sample Daily Checklists for Powered Industrial Trucks | Occupational Safety and Health Administration ([osha.gov](https://www.osha.gov))

NIOSH provides the following recommendations for conducting a thorough PIT inspection of a forklift/sit-down rider (internal combustion, electric, or LPG), which is used in many different industries.

⁴OSHA requires training every 3 years. However, if an incident occurs, additional training must be conducted [29 CFR 178 (l)(4)(ii)(B); Bobick et al. 2020].



Photo by ©Bugpai, iStock/Getty Images.

General Information

The forklift operator should always follow manufacturers' instructions for the specific type of PIT being inspected (such as forklift, narrow aisle reach, walkie pallet lift, or tow tractor/tug).

- OSHA does not require the pre-operational inspections to be documented in writing; however, it may facilitate the daily inspection process. In addition, the *employer* may require the pre-operational inspections to be documented.
- All deficiencies and defects discovered during the pre-operational inspection should be reported to the supervisor immediately. Do not delay or wait until the next shift to report any deficiencies or defects.
- Remove the PIT from service (deadline** or red tag) and do not return the PIT to service until all deficiencies and defects are corrected by trained technicians or PIT-certified personnel.

Inspection (see page 4)

Inspection items that are specific to certain types of forklifts: (see page 5)

Acknowledgments

This document was prepared by Sarah Hughes (Division of Science Integration), Thomas Bobick (Division of Safety Research), and Susan Afanuh (Division of Science Integration), NIOSH.

Suggested Citation

NIOSH [2021]. Conducting a daily inspection of powered industrial trucks (forklift, narrow-aisle reach trucks, walkie pallet lift, and tow tractor/tug). By Hughes S, Bobick T, Afanuh S. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2022-100, <https://doi.org/10.26616/NIOSH PUB2022100>

**“Deadline” means to remove a vehicle or piece of equipment from operation or use because it is inoperative due to damage, malfunctioning, or needs repairs, it is unsafe, etc.

References

- BLS [2019]. Injuries, illnesses, and fatalities. Washington, DC: Bureau of Labor Statistics, Census of Fatal Occupational Injuries. <https://www.bls.gov/iif/oshcfoi1.htm#2019>
- Bobick TG, Hause M, Socias-Morales C, Gwilliam M, Decker T [2020]. Forklift safety: a pilot study evaluation of retrofit lights. *Prof Safety* 65(12):41–45.
- CFR. Code of Federal Regulations. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.
- NIOSH [2001]. Preventing injuries and deaths of workers who operate or work near forklifts. NIOSH Alert. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 2001-109. <https://www.cdc.gov/niosh/docs/2001-109/pdfs/2001-109.pdf?id=10.26616/NIOSH PUB2001109>
- NIOSH [2020]. Fatality Assessment and Control Evaluation (FACE) Program. Cincinnati, OH: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. <https://www.cdc.gov/niosh/face/>
- OSHA [no date]. Powered industrial trucks (forklifts) etool. Washington, DC: U.S. Department of Labor, Occupational Safety and Health Administration. <https://www.osha.gov/SLTC/etools/pit/forklift/types/classes.html#class1>
- OSHA [no date]. Sample daily checklists for powered industrial trucks. Washington, DC: U.S. Department of Labor, Occupational Safety and Health Administration. <https://www.osha.gov/training/library/powered-industrial-trucks/checklist> <https://www.osha.gov/training/library/powered-industrial-trucks/checklist-0>

Inspection

- Conduct the pre-start, visual inspection with the PIT turned off and the key removed.
- Check the fluid levels (depending on the type of forklift).
 - Engine oil (dipstick)
 - Water level (electric forklift)
 - Hydraulic fluid (red cap, dipstick, the mast must be down, in neutral)
 - Electrolyte levels (on electric forklifts)
 - Do not attempt to fill fluid levels unless trained to do so.
- Inspect the mast chains and hydraulic hoses for leaks, cracks, and other visible damage.
- Use a stick to check the chain tension. Do not put your hands or any other body part inside the mast.
- Inspect the tires:
 - Tire condition (Look for chunking, cracking, cuts, gouges.)
 - Tire pressure (Ensure that tires are not low/flattened); do not adjust the air pressure in a pneumatic tire unless trained to do so.
- Inspect the wheels:
 - Check for cracks.
 - Look for abnormal wear or damage.
- Inspect the condition of the forks:
 - The top clip retaining pin and heel pin (to secure extensions and attachments) are in place, functioning (not broken or bent).
 - The fork tips are even (3 degrees or more of deflection up or down calls for replacement), not bent.
- Ensure that the load backrest extension is functioning properly.
- Ensure that there are no chips, cracks, or excessive wear.
- Inspect the safety plates, labels, and warning decals:
 - Labels are secured to the PIT, legible, and visible.
 - Labels correctly match the make, model, and load capacity.
- The nameplate matches the model, serial number, and any attachments.
- Inspect the overhead guard (if applicable):
 - The guard is securely mounted to the PIT.
 - There are no bent, twisted, cracked, or missing components.
 - A clear line of sight from operating position to maximum elevation of forks and load.
- Ensure the operator manual is physically located on the truck and legible (easy to read).
- Check the operator compartment (no debris, check behind pedals, look for grease, presence of pedal pads and floor mat).
- Inspect the operator restraint system:
 - Operator seat is securely mounted to the seat deck.
 - Seat deck latch is in place and locks the seat deck in the closed position.
 - Operator seat adjustment is functioning properly and locks the operator's seat in place.
 - Bottom and rear seat cushions are in place and in good condition (no cracks or cushion chunks missing).
 - Lateral/hip restraints are in place and securely mounted to the operator's seat.
 - Both sides of the seat belt are securely mounted to the seat frame and are operational and in good working condition (not frayed, worn, or cut, and if applicable the ratchet lock is working properly).
- Ensure that functional finger guards are attached (if applicable).
- Check underneath the PIT for signs of leakage.
- Conduct the operational inspection with the PIT turned on and running:
 - Operate the PIT in forward and then in reverse.
 - Check proper operation of all hydraulic functions (noise, leakage, levers return to neutral).
 - Check accelerator pedal operation to ensure it is free and not binding.

- Check for unusual noises.
- Test the following parts and equipment for defects or deficiencies:
 - Inching control pedal (if included on the PIT)
 - Brakes (foot brakes, parking brake, dead-man seat brake)
 - Verify there is no brake fluid leakage (test per the operator’s manual).
 - Steering: check for proper operation; verify there is no hydraulic oil leakage.
 - Clutch and gearshift
 - Horn, lights^{††}, and back-up alarm (must be operational), or any other safety devices the unit has been equipped with such as “blue lights” or strobes
- Check the following parts and equipment for defects or deficiencies:
 - Hour meter
 - Defroster and wiper
 - Cab heater
 - Gauges
 - Cables and stops
 - Overhead guard
 - Roll over protection structure (ROPS), if present
 - Battery charge status
 - Fire extinguisher (inspected and charged), if present

Inspection items that are specific to certain types of forklifts:

Electric Forklifts:

- Inspect cables and connectors for frayed or exposed wires.

^{††}Head lights also help the operator when loading/unloading box trailers. Consider retrofitting forklifts with lights to increase safety measures. For more information, see Bobick TG, Hause M, Socias-Morales C, Gwilliam M, Decker T [2020]. Forklift safety: a pilot study evaluation of retrofit lights. Prof Safety 65(12):41–45.

- Inspect the battery for corrosion and make sure that the battery restraints are fastened.
- Inspect the hood latch.
- Check the electrolyte levels, if trained to do so, while wearing personal protective equipment (PPE) (gauntlet gloves, rubber apron, and face shield).
- Check for correct plugging/regen operation (all electric types).
- Class 3 (walkie type trucks): check for proper operation of emergency reverse.
- Class 2 (reach trucks and order pickers): check operation of emergency stop and presence of mast guard (windshield or screen).

Internal Combustion Forklifts (gas or diesel):

- Check the engine oil (dipstick).
- Check the transmission fluid.
- Check the brake fluid reservoir.
- Check engine coolant levels (usually near the battery).
- Inspect the air filter indicator (if applicable); do not remove the air filter unless trained to do so.
- Inspect belts and hoses for leaks or cracks.
- Examine the radiator for cracks.
- Inspect the hood latch.
- Check the fuel sedimenter (diesel).

LPG Forklifts:

- Wear PPE for tank inspection (gauntlet gloves, apron, and face shield).
- Ensure that the LPG tank is properly and securely mounted (the pressure relief valve must be in the 12 o’ clock position and not pointed toward the operator).
- Check the LPG fuel levels in the LPG fuel tank.
- Inspect all hoses, connectors, and LPG tank restraint brackets.
- Inspect the LPG tank for dents, dings, and leaks.

For More Information

More information about machine safety in various industries is available on the NIOSH website: <https://www.cdc.gov/niosh/topics/machine/>

Find NIOSH products and get answers to workplace safety and health questions:

1-800-CDC-INFO (1-800-232-4636)

TTY: 1-888-232-6348

CDC/NIOSH INFO: [cdc.gov/info](https://www.cdc.gov/info/) | [cdc.gov/niosh](https://www.cdc.gov/niosh/)

Monthly *NIOSH eNews*: <https://www.cdc.gov/niosh/enews/>

Mention of any company or product does not constitute endorsement by NIOSH. In addition, citations to websites external to NIOSH do not constitute NIOSH endorsement of the sponsoring organizations or their programs or products. Furthermore, NIOSH is not responsible for the content of these websites.

This document is in the public domain and may be freely copied or reprinted. NIOSH encourages all readers of the *Workplace Solutions* to make them available to all interested employers and workers.

As part of the Centers for Disease Control and Prevention, NIOSH is the Federal agency responsible for conducting research and making recommendations to prevent work-related illnesses and injuries. All **Workplace Solutions** are based on research studies that show how worker exposures to hazardous agents or activities can be significantly reduced.

DOI: <https://doi.org/10.26616/NIOSH PUB2022100>

DHHS (NIOSH) Publication No. 2022-100

October 2021

