



EQUIPMENT MAINTENANCE GUIDE

EMAIL

localfor'klifts@gmail.com

PHONE NUMBER

469-547-7346

ADDRESS

9003 Sovereign Row
Dallas, Texas 75247

THE OVERVIEW

Dear Valued Customer,

I want to say thank you for investing in our business as we invest in yours and allowing my team to be your matchmaker of Forklifts.

Here at Local Forklift, we strive to provide an awesome experience and service. We hope that it has been fun and memorable, and hope that we can help you again in the future. If you have any concerns, questions or comments, please get ahold of your specialist.

Thank you once again for your business, and we will look forward to matching you again in the future

Sincerely,

Local Forklift Team

FORKLIFT MAINTENANCE: THE COMPLETE GUIDE

Forklifts are just like any other piece of machinery: They need a little TLC from time to time. And if you're in charge of forklift maintenance, this task falls on you.

But if you feel a little overwhelmed, don't worry - you're in the right place.

Because we're going to show you the maintenance guidelines you should

follow to keep your lifts healthy, productive, and safe. Plus, you'll learn a few ways to save money in the process.

Specifically, we'll cover:

- The benefits of regularly maintaining your forklifts
- Your OSHA-mandated maintenance obligations
- What the different maintenance intervals are
- What factors influence how often you should service your equipment
- How to calculate your maintenance costs
- Tips for saving money on maintenance

We're also going to make it super easy to ensure you're not missing any steps.

Let's get started!

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FORKLIFT MAINTENANCE BENEFITS

Regularly performing maintenance yields some important benefits for your operation. Let's go through the biggest ones.



Longer Service Life

The more regularly a lift is serviced, the longer it will last and the more productive it will be. This will lead to a better economic life of the forklift and a better return on investment (ROI).



Better productivity

Regular maintenance means more uptime. Because the more the lift truck can run, the more your operation can produce. Plus, you can minimize disruptions to the production schedule by proactively planning maintenance around it.



Money savings

If you regularly maintain your forklift, you'll be more likely to find small problems. That includes common issues like weeping fittings, low fluid levels, and debris-filled components. If you can identify and repair these small problems early, you can save yourself from a bigger (and more expensive) repair down the road.



Better safety

Every company that uses forklift trucks has a legal and ethical responsibility to keep them in safe operating condition. Because, of course, you want to make sure your team goes home at the end of every shift in one piece.

That's why regular maintenance is so important: It can help you identify safety issues and repair them before they lead to an operator or pedestrian being injured or possibly even killed.



Higher resale value

If you plan on trading in your lift, you'll be able to recoup more of your initial investment on the secondary market. The reason is that a forklift that's in good shape will sell for more than one in bad shape. That much is obvious.

Plus, if you're leasing your forklift, you'll have to make sure that it's regularly maintained. Or you'll risk a hefty bill once the lease is up and the truck is turned in.

OSHA'S FORKLIFT MAINTENANCE REQUIREMENTS

Not only do these benefits provide powerful reasons to set up - and keep to - a maintenance schedule, but OSHA requires your lifts to be in tip-top shape before putting them into service. Here are a couple key standards from OSHA on the subject:

“

Industrial trucks shall be examined before being placed in service and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined after each shift. Defects when found shall be immediately reported and corrected.

- OSHA STANDARD 1910.178(Q)(7)

“

If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.

- OSHA STANDARD 1910.178(P)(1)

These regulations aren't to be taken lightly either. The penalties for disregarding OSHA-mandated forklift checks can be steep. In fact, companies have been fined huge sums of money for neglecting them:

- A meat company in Nebraska was fined \$22,000 by OSHA in 2012 for forklift violations that should've been caught and corrected during a pre-trip inspection.
- A transportation company in Illinois was fined \$108,020 by OSHA in 2014 for several safety violations, including failure to remove a forklift from operation that needed repairs.
- A retail chain in Ohio was fined \$258,672 by OSHA in 2018 for failure to fix faulty brakes, despite the issue being reported by their employees.

Now, you might be wondering: Is there an OSHA daily forklift inspection checklist? The answer is that OSHA does in fact provide a few generic inspection templates on their website.

But OSHA doesn't actually mandate what items must be checked. That's because they can change depending on the type of truck being used. So instead, you're expected to modify the checklists to fit the particular requirements of the equipment you're operating.

We've made this really simple by creating a free pre-shift weekly inspection sheet that you can use and make copies as needed for your files. You'll find it attached.

Daily Pre-Trip Inspection Items

We've taken the liberty to assemble the most common items that comprise a daily pre-trip inspection. And we've noted which items are for internal combustion (IC) and electric (E) trucks only.

That said, different forklifts can require different daily inspection items. So, make sure to also consult the operator's manual for the particular forklift to be operated.

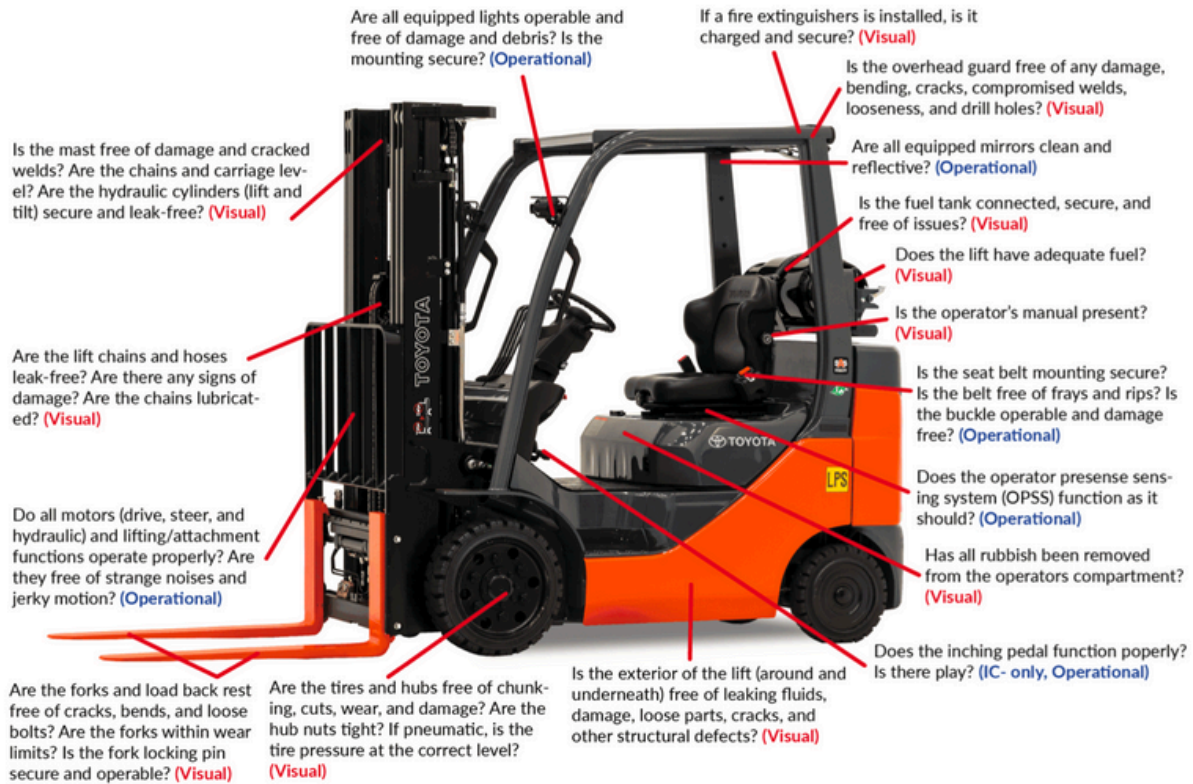
Daily Pre-Shift Visual Inspection Guide for IC and Electric Forklifts

The operator must inspect their forklift before operating each shift.

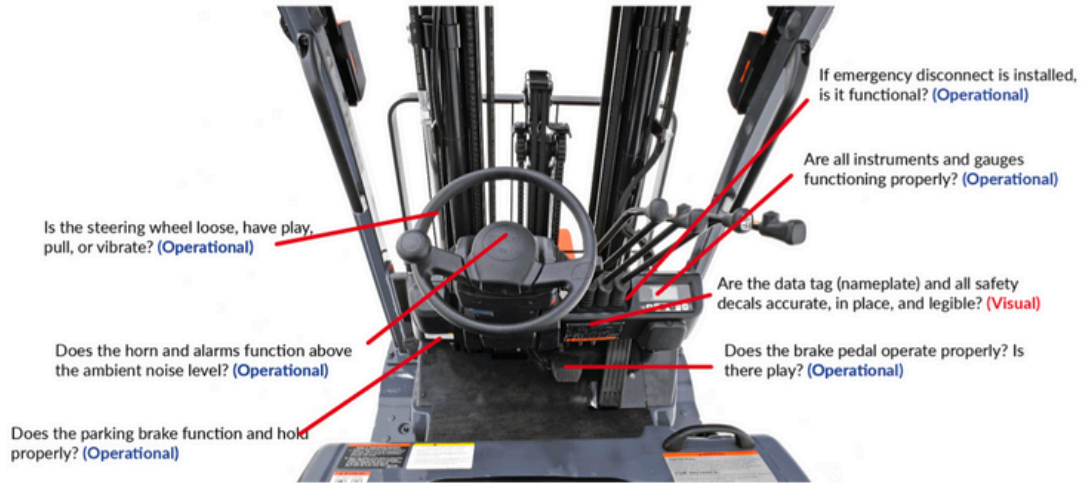
Different forklifts can require different daily inspection items. Please consult the operator's manual for the particular forklift being operated.

Visually inspect the items marked "Visual" first. Then, check those marked "Operational."

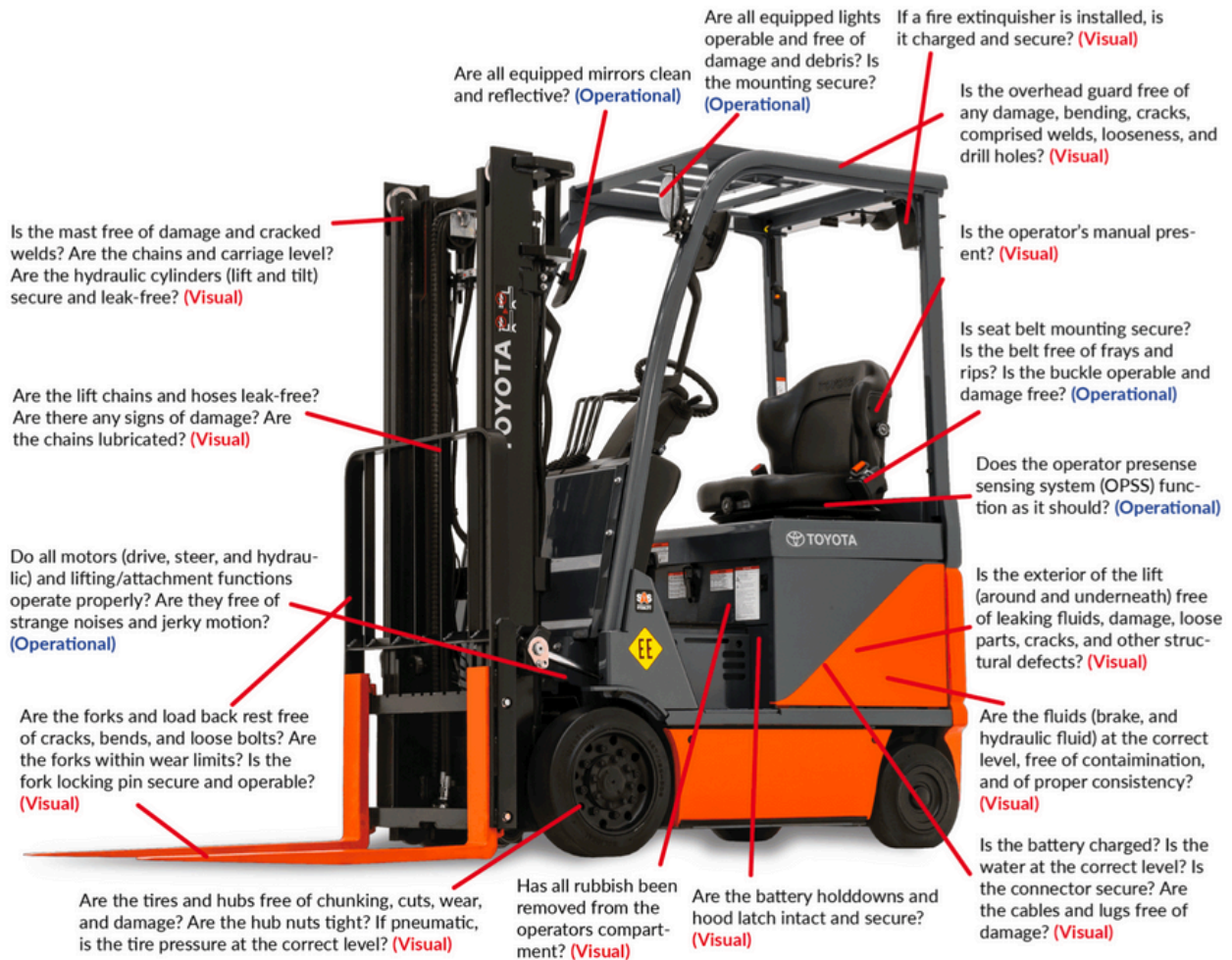
Internal Combustion (IC) Forklifts



Electric & Internal Combustion (IC) Forklifts



Electric Forklifts



HOW OFTEN SHOULD FORKLIFTS BE SERVICED?

Now that you know what items need to be checked before operating, let's move on to the actual service actions required to maintain a forklift.

For starters, the **two most common maintenance intervals** for forklifts are:

- **Every 6 weeks or 250 hours**
- **Every year or 2,000 hours**

Both of these intervals have a different set of action items that must be inspected and serviced.

And while these intervals are pretty standard, there are some other factors to consider when determining maintenance frequency. By keeping these in mind as you plan your service intervals, you'll help to keep your machine in the best (and safest) operating condition.

Factors That Affect Maintenance Frequency

Manufacturer Recommendations

You should always follow the manufacturer's recommendations for service intervals. They can vary by manufacturer and truck. But it's always listed in the operator's manual. (Remember: Every forklift is required to have a manual on it at all times!)

Fuel Type

Because internal combustion (IC) and electric forklifts have different components, they need to be serviced at different intervals. Internal combustion trucks will need more frequent maintenance, since they have more moving parts. But electric lifts require less maintenance to be performed less often, because they have fewer moving parts.

Manufacturer Recommendations

Trucks used in corrosive or abusive environments are going to need more frequent maintenance.

Facilities with tough environments include:

- Food processing plants
- Steel and metal processors
- Recycling plants (especially those with lots of paper and debris)
- Wood and pulp plants
- Concrete factories
- Chemical plants

Service History

Does the forklift have a less-than-stellar history? Do service records show the same issue(s) appearing frequently? Do operators regularly complain about it? If the truck is a bad apple, it'll need more frequent maintenance. You'll want to make sure to keep an eye on its known problems, in order to keep them at bay.

Hours of Usage

If the lift will be run more often, it'll require more frequent service. That's key for operations that run their lifts multiple shifts. Also, lift trucks with higher hours require more frequent maintenance. But be careful: There will come a point at which the lift becomes too expensive to continue repairing. That's called the "economic life" of the forklift. And it means you're financially better off buying another one. We'll cover this concept in more detail a little later on in this post.

HOW MUCH DOES IT COST TO MAINTAIN A FORKLIFT?

As you now know, there are a variety of factors that influence how often you need to maintain your forklift. That also means how much it costs to maintain your trucks will vary as well. Plus, maintenance costs rise as lifts age. So your costs won't be the same, for the same lift, from year to year.

That said, a rule of thumb is that **maintenance costs can range from \$0.48 to \$1.67 per operating hour**, and up from there.

How to Calculate Your Own Forklift Maintenance Costs

First off, you'll need to know the following data:



ANNUAL HOURS THE FORKLIFT TO BE SERVICED IS IN OPERATION

For example, if the lift is to be used 8 hours per day, 5 days per week, and 50 weeks per year, it would be in operation 2,000 per year.



SERVICE INTERVAL TO BE PERFORMED

Depending on the number of hours the forklift to be serviced is used, you'll have to perform 250 and/or 2,000 hour services.



NUMBER OF HOURS TO COMPLETE EACH SERVICE INTERVAL

This can vary by the training and experience of the technician performing the service. But good times to aim for are as follows:

	250-Hour Service	2,000-Hour Service
IC Forklift	2-3 Hours	4-6 Hours
Electric Forklift	1-2 Hours	4-6 Hours



COST OF PARTS PER SERVICE INTERVAL

This can vary depending on a number of factors. But a good rule-of-thumb is as follows:

	250-Hour Service	2,000-Hour Service
IC Forklift	\$40 - \$50	~\$300
Electric Forklift	\$10 - \$20	\$100 - \$200

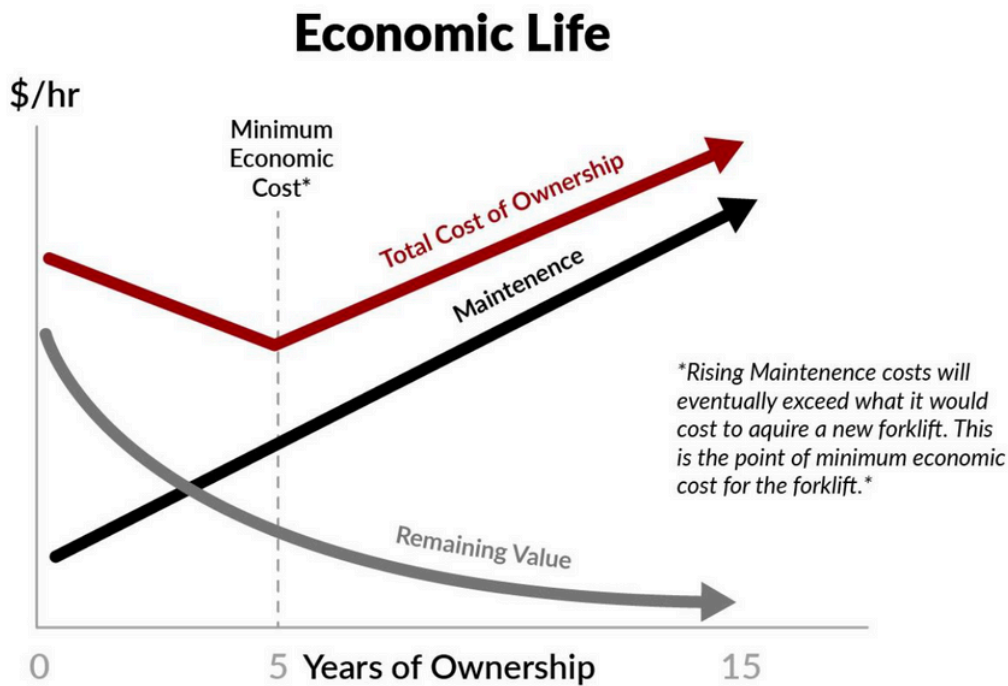


COST OF LABOR PER HOUR

Use your own internal costs of labor if performing the services in-house. If relying on a service center for maintenance, use their hourly figure.

When Maintenance Costs Too Much

Keep in mind that there is an upper limit to how much you should pay for maintenance. It's called the "economic life" of your forklift. And if you see the cost of maintenance inching towards \$4 per hour, that's your cue to look into buying another forklift.



The "economic life" of a forklift is the point at which maintenance costs exceeds the cost of purchasing the new forklift.

Ways to Save Money on Maintenance

Now that you have a baseline figure for maintenance costs, here are some helpful and actionable tips you can use to cut that figure down.

Perform Regular Maintenance

It might sound counterintuitive, but the more maintenance you regularly perform, the lower your repair bills will be. That's because regular maintenance should help you catch little problems before they snowball into bigger problems.

Wash your Forklifts Regularly

If your lift operates in an especially dirty environment, you should wash it down with soap and water. Not only can dirt and debris cause a number of issues, including binding of the tires, mast damage, and electrical issues. But OSHA requires your forklifts to be clean:

“

"Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 °F.) solvents shall not be used. High flash point (at or above 100 °F.) solvents may be used. Precautions regarding toxicity, ventilation, and fire hazard shall be consonant with the agent or solvent used."

- OSHA STANDARD 1910.178(Q)(10)

Pay special attention to the radiator in particular. Clogged radiators will cause the truck to overheat and can lead to costly damage if allowed to persist. So, include blowouts with air at least once per shift, unless more often is required.

Retire Old Trucks

Remember that “economic life” stuff we just talked about? Well, get rid of old equipment when it reaches that break point. Otherwise, you'll start sinking into a deep money pit. Stick with newer equipment - as much as you can - in order to lower your maintenance costs.

Sign Up For Planned Maintenance

If you don't have trained and qualified technicians, or if you simply don't have the manpower to maintain your forklifts regularly, you may be better off signing up for a maintenance plan with a service center or dealership in your area.

Ideally, the center you choose should have technicians who are factory-trained by the manufacturer of the lifts that you currently use. Because that training should equip them with everything they need to diagnose and repair problems quickly and efficiently. And that will ultimately help you save money.

If you're contracting your maintenance out, it usually comes in two different packages: Planned maintenance and full maintenance plans. With planned maintenance, usually only the labor is covered. While full maintenance plans typically include parts as well.

THE MOST COMMON FORKLIFT MAINTENANCE SERVICE ACTIONS

We've broken down the most common service actions that you'll need to perform by component system. And as in the daily inspection section, we've noted which items are for internal combustion (IC) or electric (E) trucks only.

For a more extensive list, make sure to check out the FREE checklists for each service interval. You'll find them in the next section below.

Power & Drive System

- Inspect for any fluid leaks
- Change engine oil and filter (IC)
- Examine starting condition and check for any strange noises (IC)
- Check fuel system for leaks (IC)
- Inspect differential, torque converter, and transmission for oil level, leaks, looseness, and function (IC)
- Check clutch and inching pedal function (IC)
- Inspect fuel filter element for clogs (IC)
- Clean the air filter (IC)
- Check radiator coolant level and for leaks (IC)
- Check coolant hoses for wear/damage (IC)
- Check fan belt tension and for damage (IC)
- Inspect exhaust system for operation, leaks, and damage (IC)
- Measure carbon monoxide concentration in exhaust gas (IC)
- Inspect drive unit for oil leakage and level (E)
- Listen to motor rotation sound (E)
- Check motor and battery terminal for looseness (E)
- Check battery connector condition and connection (E)
- Check battery charging and electrolyte level (E)
- Inspect battery case for damage or wear (E)
- Measure the specific gravity of the battery (E)

Wheels, Axles, Steering & Brakes

- Check tires for air pressure, damage, debris, and wear
- Tighten hub nuts
- Check rim and side ring for damage
- Inspect front and rear wheel bearings for noise and looseness
- Check rear axle beam for looseness
- Inspect steering wheel for functionality and play
- Check power steering for oil leakage and mounting for looseness
- Check kingpins for looseness
- Check brake fluid level
- Test braking and park brake function, play, and operating force

Forks, Attachment, Mast & Chains

- Check forks and stopper pin for wear/damage
- Check mast, mast rollers, mast strip, and lift bracket for cracked welds, looseness, and damage
- Lubricate lifting chains
- Check chain tension and look for damage
- Inspect chain anchor bolt and chain wheel for condition
- Check over attachment for damage, mounting security, and abnormal operation

Hydraulic System

- Test overall hydraulic system operation
- • Replace hydraulic oil return filter
- • Inspect oil pump for leakage and unusual noises
- • Check hydraulic tank oil level and for signs of contamination or leaks
- • Check hydraulic cylinder mounting, cylinder rod, rod screw, and rod end for leaks, looseness, uneven lifting, and damage
- Inspect control valve for leaks
- Check hydraulic levers for looseness
- Measure lifting speed and natural drop for all cylinders

Heads Up....

These checklists were adapted from Toyota's internal combustion and electric forklift operator's manuals. They are not meant to be exhaustive. Please consult the operator's manual for your particular forklift before performing maintenance. You can simply edit the Excel files and add any extra items you find.

And remember: **Only trained and authorized technicians should perform service on forklifts.**

The operator should check each item above every day before operating the lift. If running multiple shifts, they should perform the inspection before each shift.

WRAPPING IT UP

There you have it. You now know what forklift maintenance consists of, how frequently it must be performed, and how much it costs. Plus, you've got some handy checklists to make sure you don't miss a step.



9003 Sovereign Row
Dallas, Texas 75247

localforklifts@gmail.com

469-547-7346

6-Week (250-Hour) Forklift Maintenance Checklist *(for Internal Combustion Forklifts)*

Date:	
Unit Number:	
Forklift Make:	
Forklift Model:	
Forklift Serial Number:	
Hour Meter:	

Note: This checklist was adapted from Toyota's 8FG-8FGCU 15-32 internal combustion forklift operator's manual. It is not meant to be exhaustive. Please consult the operator's manual for your particular forklift before performing maintenance. Only trained and authorized technicians should perform service on forklifts.

System	Action	Maintenance Item	Complete?
Engine, Transmission & Fuel System	Inspect	Oil leaks	
		Starting condition and unusual noises	
		PCV valve and piping for clogs and damage	
		Fuel system for leaks	
		Differential for oil level and leaks	
		Torque converter and transmission for oil level, leaks, looseness, and function	
		Control valve and clutch function	
		Inching valve function	
		Carburetor link mechanism	
	Fuel filter element for clogs		
	Change	Engine oil and filter (if new). If old, check oil filter for clogging	
	Clean	Air filter	
Measure	Engine rotating condition during idling & acceleration		
	Engine valve clearance		
	Governor for maximum no-load stabilized rotation speed		
Exhaust & Cooling Systems	Inspect	Radiator coolant level and for leaks	
		Coolant hoses for wear/damage	
		Radiator cap condition	
		Fan belt tension and for damage	
		Exhaust system for operation, leaks, and damage	
		Carbon monoxide concentration in exhaust gas	
	Measure		
Wheels & Axles	Inspect	Tire air pressure	
		Tires for damage, debris, wear, and tread depth	
		Rim and side ring for damage	
		Front and rear wheel bearings for noise and looseness	
		Rear axle beam for looseness	
		Hub nuts for looseness	
		Steering wheel for functionality and play	
Steering & Brakes	Inspect	Steering valve for leakage	
		Power steering for oil leakage	
		Power steering mounting and linkage for looseness	
		King pin for looseness	
		Brake fluid level	
		Braking operation	
		Parking brake function and operating force	
		Parking brake linkage and cable for looseness and damage	
		Brake pipe and hose for leakage and damage	
		Steering valve mounting for looseness	
		Measure	Brake pedal play and reserve



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12-Month (2000-Hour) Forklift Maintenance Checklist *(for Internal Combustion Forklifts)*

Date:	
Unit Number:	
Forklift Make:	
Forklift Model:	
Forklift Serial Number:	
Hour Meter:	

*Note: This checklist was adapted from Toyota's 8FG-8FGCU 15-32 internal combustion forklift operator's manual. It is not meant to be exhaustive. Please consult the operator's manual for your particular forklift before performing maintenance.
 Only trained and authorized technicians should perform service on forklifts.*

System	Action	Maintenance Item	Complete?
Engine, Transmission & Fuel System	Inspect	Oil leaks	
		Starting condition and unusual noises	
		PCV valve and piping for clogs and damage	
		Fuel system for leaks	
		Differential for oil level and leaks	
		Torque converter and transmission for oil level, leaks, looseness, and function	
		Control valve and clutch function	
		Inching valve function	
		Carburetor link mechanism	
		Fuel filter element for clogs	
		Inspect the propeller and axle shaft joint for looseness	
		Draining of the fuel sedimenter	
		Engine cylinder head bolts for looseness	
		Differential bolts for looseness	
	Propeller and axle shafts for spine looseness		
	Universal joint for looseness		
	Axle shaft for twisting and cracks		
	Change	Engine oil and filter (if new). If old, check oil filter for clogging	
Clean	Air filter		
Measure	Engine rotating condition during idling & acceleration		
	Engine valve clearance		
	Governor for maximum no-load stabilized rotation speed		
	Injection timing		
	Perform a stall test and measure oil pressure		
	Engine valve clearance		
	Engine compression		
	Injection nozzle pressure and condition		
Exhaust & Cooling Systems	Inspect	Radiator coolant level and for leaks	
		Coolant hoses for wear/damage	
		Radiator cap condition	
		Fan belt tension and for damage	
		Exhaust system for operation, leaks, and damage	
		Rubber radiator mount	
		Rubber muffler mount	
		Exhaust system pipe joints for looseness and damage	
		Exhaust vacuum sensor for damage	
		Exhaust register for damage	
	Water temperature sensor for damage		
	Oxygen sensor for damage		
	Measure	Carbon monoxide concentration in exhaust gas	
	Clean	Exhaust injector and check for damage	
Wheels & Axles	Inspect	Tire air pressure	
		Tires for damage, debris, wear, and tread depth	
		Rim and side ring for damage	
		Front and rear wheel bearings for noise and looseness	
		Rear axle beam for looseness	
		Hub nuts for looseness	



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469-547-7346

6-Week (250-Hour) Forklift Maintenance Checklist (for Electric Forklifts)

Date:	
Unit Number:	
Forklift Make:	
Forklift Model:	
Forklift Serial Number:	
Hour Meter:	

*Note: This checklist was adapted from Toyota's 7FBE15-20 electric forklift operator's manual. It is not meant to be exhaustive. Please consult the operator's manual for your particular forklift before performing maintenance.
Only trained and authorized technicians should perform service on forklifts.*

System	Action	Maintenance Item	Complete?
Power & Drive System	Inspect	Drive unit for oil leakage and level	
		Motor rotation sound	
		Motor terminal for looseness	
		Battery charging level	
		Battery electrolyte level	
		Battery terminal for looseness	
		Upper battery case of abnormalities	
		Battery connector for condition and connection	
	Measure	Specific gravity of the battery	
Wheels & Axles	Inspect	Tires for debris and damage	
		Rim, side ring and disc wheel for damage	
		Front and rear wheel bearings for unusual noises and looseness	
		Hub nuts for looseness	
	Measure	Tire tread depth	
Steering & Brakes	Inspect	Steering wheel for play and operation	
		Steering valve for leakage	
		Power steering for oil leakage and check level	
		Power steering for looseness in mounting parts	
		Brake pedal operation	
		Parking brake pull margin operating force	
		Parking brake effectiveness	
		Braking rod and cable for operation, looseness, and damage	
		Disc brakes for disk to pad clearance	
		Steering valve mounting for looseness	
Forks, Attachment, Mast & Chains	Inspect	Fork and stopper pin condition	
		Forks for wear and deformation	
		Mast and lift bracket for cracks, damage, and deformation in welds	
		Roller bearing looseness	
		Mast and lift bracket for looseness	
		Mast support metal for wear and damage	
		Rollers for operation, wear, and damage	
		Chain for tension, deformation and damage	
		Chain anchor bolt condition	
		Chain wheel for operation, wear, and damage	
		Chain wheel bearing for wear	
		Attachment for abnormalities and mounting condition	
	Lubricate	Lifting chains	
		Hydraulic rod and rod end for deformation and damage	
		Cylinder operation	
		Hydraulic cylinders for oil leaks and damage	



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12-Month (2000-Hour) Forklift Maintenance Checklist *(for Electric Forklifts)*

Date:	
Unit Number:	
Forklift Make:	
Forklift Model:	
Forklift Serial Number:	
Hour Meter:	

Note: This checklist was adapted from Toyota's 7FBE15-20 electric forklift operator's manual. It is not meant to be exhaustive. Please consult the operator's manual for your particular forklift before performing maintenance.
Only trained and authorized technicians should perform service on forklifts.

System	Action	Maintenance Item	Complete?
Power & Drive System	Inspect	Drive unit for oil leakage and level	
		Motor rotation sound	
		Motor terminal for looseness	
		Battery charging level	
		Battery electrolyte level	
		Battery terminal for looseness	
		Upper battery case of abnormalities	
		Battery connector for condition and connection	
	Measure	Drive unit nuts and bolts for looseness	
		Specific gravity of the battery	
Wheels & Axles	Inspect	Measure motor insulation resistance	
		Measure battery insulation resistance	
		Voltage of each battery cell (after charging)	
		Tires for debris and damage	
		Rim, side ring and disc wheel for damage	
	Measure	Front and rear wheel bearings for unusual noises and looseness	
		Hub nuts for looseness	
		Front and rear axles for deformation and damage	
		Tire tread depth	
		Steering wheel for play and operation	
Steering & Brakes	Inspect	Steering valve for leakage	
		Power steering for oil leakage and check level	
		Power steering for looseness in mounting parts	
		Brake pedal operation	
		Parking brake pull margin operating force	
		Parking brake effectiveness	
		Braking rod and cable for operation, looseness, and damage	
		Disc brakes for disk to pad clearance	
		Steering valve mounting for looseness	
		Right and left turn angle	
		Power steering hose for damage	
		Brake discs sliding portion and pad wear	
		Brake discs for disc wear and damage	
	Disc mounting parts for looseness		
	Measure	Brake disc return spring fatigue	
Fork and stopper pin condition			
Forks, Attachment, Mast & Chains	Inspect	Forks for wear and deformation	
		Mast and lift bracket for cracks, damage, and deformation in welds	
		Roller bearing looseness	
		Mast and lift bracket for looseness	
		Mast support metal for wear and damage	
		Rollers for operation, wear, and damage	
		Chain for tension, deformation and damage	

