



# FORKLIFT BATTERY BEST PRACTICES

*The Power Behind Performance*

*Industrial Products Group*

A photograph of a warehouse interior. A worker wearing a white hard hat and a light-colored shirt is operating a green forklift. The forklift is moving through a narrow aisle between tall stacks of wooden pallets. The scene is captured with a slight motion blur, suggesting the forklift is in motion. The lighting is bright, coming from overhead industrial fixtures.

**FOR GREATER  
UPTIME AND  
SIMPLER  
MAINTENANCE**



# BASICS OF A FORKLIFT BATTERY

Batteries are the electrical heart of forklifts. They deliver power and provide a counterweight to maximize lifting capacity and stability.

**A reliable battery can maximize your uptime, performance, and ROI.**

But the wrong battery (or maintenance schedule) can lead to decreased performance or, worse yet, downtime.

And if your forklift batteries fail, business stops.

**Even brief downtime – lost productivity, delays, and contract penalties – can far exceed the cost of the forklift battery.**



So how do you maximize uptime – and streamline maintenance?

The best approach combines battery selection with other best practices – to ensure the best reliability, safety, and performance from your batteries.

## **In this Forklift Battery Best Practices Guide, You Will Learn:**

- ▶ How to select the right battery for your forklift
- ▶ Little-known questions you must ask before you buy your next forklift battery
- ▶ Handling recommendations for maximum safety
- ▶ Common charging mistakes (and how to prevent them)
- ▶ 6 Steps to Forklift Battery Maintenance
- ▶ Replace or repair? The basic diagnostic checklist for broken batteries
- ▶ Where to buy Crown batteries (and how to know if they're right for you)



## Before purchasing or leasing a battery, ask yourself:

- ▶ What is the vehicle voltage?
- ▶ What is the compartment size?
- ▶ Will you need to purchase a cover?

## FIRST, SELECT THE RIGHT BATTERIES FOR YOUR SYSTEM

Forklift batteries are a critical business investment.

When batteries are engineered better, built to precise specifications, and assembled with higher-quality components – they will last longer, require less maintenance, and eliminate common causes of downtime.

### Here are the Forklift Battery Features to Look For:

- ▶ **Gravity cast plates** enhance battery life and reliability by removing impurities in the grid.
- ▶ **Thicker, heavier plates** decrease corrosion and allow for more cycles (more material for chemical reactions).
- ▶ **Automated pasting** improves active material reliability and consistency. Industrial computers optimize for and adjust dozens of operating parameters in realtime – compared to imprecise, periodic manual adjustments in conventional pasting.
- ▶ **Computer-controlled curing ovens and oxide mixing** eliminate common failure modes and maximize active material performance.
- ▶ **Automated plate wrapping and advanced separator technology** prevent plate short-circuits.
- ▶ **Added active material** improves reliability, capacity, and lifespan. (Note: Some companies skimp on active material because it's 60% to 80% of the battery's cost. Unfortunately, that shortcut comes at a price to end users: Less active material for chemical reactions results in fewer cycles.)

*Armed with this checklist, you'll know which battery features (and which batteries) to avoid – and which are best at providing the uptime, performance, and ROI you need.*



Battery chargers are often a separate purchase. Their initial cost will vary based on specifications. For instance, do you need a portable charger that plugs into a standard outlet or one that is wired into a building's electrical system?

You may be able to save thousands of dollars in electricity costs, charging time, and longer battery life by selecting a smart charger – at only a small up-front premium. Higher-efficiency units can reduce kWh usage and help avoid overcharging (overcharging damages batteries).

Once you've invested in a forklift battery – whether purchased or leased – be sure you get the most out of it with proper maintenance and safe handling.

## **“Insider” Questions to Ask Your Battery Supplier or Manufacturer.**

The right questions will tell you more than any brochure or sales pitch...and reveal red flags before you've signed on the dotted line.

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### ***How long has this battery technology been tested and proven in the field?***

If a battery manufacturer claims a 10- or 15-year lifespan but hasn't even been around for that long – that's a red flag.

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### ***How long has your company been in business?***

Of course, age doesn't necessarily correlate with stability and knowledge. But in an industry littered with new companies and technologies that failed after a handful of years... an established company's reputation and history help you sleep at night. (Crown Battery has been in business since 1926.)

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### ***Have you filed for bankruptcy recently?***

Bankruptcy may indicate poor products or service. But it's a guarantee of financial instability. The biggest problem for you? Bankrupt battery companies are often obligated to pay their investors and debtors first, leaving you and your warranty in the lurch.

(Google the battery manufacturer to double-check whether they've filed for bankruptcy.)

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### ***Did my distributor/salesperson/installer account for proper Depth of Discharge?***

Depth of Discharge is like gas in your car's tank; always have enough reserves to avoid getting stranded.

Some companies deliberately undersize customers' battery banks, so they can be "cheaper." Don't be fooled - it's the equivalent of getting a half tank of gas... and paying 90% of the full tank price.

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### ***Do I need to purchase a standalone Battery Management System (BMS) just to use your batteries?***

BMS can be great. But some battery chemistries are too unstable to operate safely without it – and BMS is an out-of-pocket cost that you might not see when you sign on the dotted line.

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### ***Can you share case studies – or introduce me to a few customers who are happy with your batteries and service?***

Remember, these case studies don't have to be specific to forklifts; you're simply looking for results from clients or partners who've used the manufacturer's batteries and services.

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## SAFE HANDLING AND CHANGING

Since forklift batteries can weigh 800-6,000 pounds, no one person should attempt to lift a forklift battery on their own. Specialized equipment, such as a Walkie Pallet Jack, is recommended to assist. Whatever method you choose to lift forklift batteries, always wear steel-toed boots for safety.

Because of the materials present in all batteries, personal protective equipment (PPE) is necessary. Be sure to wear appropriate clothing when handling or moving batteries. When moving forklift batteries, wear chemical resistant protective gear and rated protective eyewear. Ensure that an eye- and hand-washing station is nearby in case of contact.

We recommend using a forklift battery changer to swap out batteries. These devices assist in safe battery removal and installation.

*Note that device specifics vary: Mobile battery changers are driven to the forklift and battery; in fixed installations, the forklift is driven to the changer.*





## Here's What We've Found Works Best:

Put routine maintenance in the calendar – and in the job description.

Putting maintenance into the calendar or weekly/monthly task list sets a clear set of expectations about maintenance. That is, that maintenance is a requirement – just like attending safety training or another meeting.

Finally, during the hiring process, many clients have told us they were explicit about maintenance being a required part of the job. Over time, routine maintenance events become solid maintenance habits.

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**THE RESULT:** Forklifts that last longer, operate at full power for more hours, and never leave you worried about downtime.

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# 6 SIMPLE STEPS TO FORKLIFT BATTERY MAINTENANCE

Regular maintenance keeps forklifts running properly and reliably – and that means greater uptime.

A forklift battery should last for a number of years with proper care and maintenance, too. The result: Higher ROI and lower operating costs.

## What's the Best Way to Maintain a Forklift Battery and Ensure It Lasts as Long as Possible? Just Follow These 6 Easy Steps:

### 1. CHARGE THE BATTERY CORRECTLY

It's tempting to charge a battery whenever it is convenient. But to properly maintain a forklift battery – and get the most value for your money – batteries should only be charged at certain times and to certain degrees.

#### Here's when to charge a forklift battery:

- ▶ It has dipped below 30% charge
- ▶ You can charge the battery until it is full. (Never interrupt a charge cycle.)
- ▶ You can stop charging the battery afterward. (Alternately, use a smart charger with the proper algorithm for your battery, to avoid overcharging.)

*Over- or under-charging a forklift battery can significantly decrease its lifespan.*

### 2. EQUALIZE BATTERIES REGULARLY (FLOODED BATTERIES)

Flooded or wet cell batteries should be equalized regularly. Equalization reverses the chemical process of stratification, which concentrates acid at the bottom of the battery. (When acid and water become stratified, the battery cannot hold a charge as well.)

Equalizing rebalances the electrolyte concentration and helps to remove sulfate crystals from battery plates.

Only equalize using a battery charger with an Equalize setting.

Many batteries need equalization every 5-10 charging cycles; consult your battery maintenance specifications before initiating the process.

### 3. CHECK FLUID LEVELS (FLOODED BATTERIES)

Flooded batteries require proper fluid levels for optimum capacity.

Their fluid also prevents plates from drying out, a terminal condition.

#### Approximately every five charge cycles, check battery fluid levels:

- ▶ After putting on personal protective equipment, open up the battery.
- ▶ Check 2-3 cells to ensure fluid is covering the plastic battery element. (A common recommendation is at least ¼ inch of water above battery plates.)
- ▶ If unsure, check all cells.
- ▶ If there is not enough fluid upon inspection, move on to the next step and add water.

## 6 SIMPLE STEPS TO FORKLIFT BATTERY MAINTENANCE CONTINUED

### 4. MAINTAIN WATER LEVELS (FLOODED BATTERIES)

If fluid levels are low:

- ▶ Ensure that the battery is fully charged before topping off.
- ▶ Top off the fluid in the battery using deionized or distilled water. (Impure water, or water outside 5-7pH, can lead to battery damage.)

**This will be necessary approximately every ten charges if the battery is brand new.**

- ▶ Do not overfill the battery. Extra space is required for normal expansion when the battery is in use.
- ▶ As necessary, put battery caps back in place and tighten.
- ▶ Always check your manufacturer's manual for safety precautions and battery-specific instructions.

***NOTE: Maintenance-free batteries do not need to be topped off.***

### 5. KEEP BATTERIES AT A SAFE TEMPERATURE

Forklifts may be used in extreme environments. And ambient temperature is a critical factor for battery longevity, capacity, and safety.

Because any batteries stored and used in extreme heat and cold are more likely to suffer early failure – and require more maintenance (or repairs).

Keeping any battery at a safe temperature, not exceeding 45°C (113° F), will prolong lifespan. If higher operating temperatures can't be avoided, ensure good air circulation in and around the battery compartment for optimal cooling.

### 6. MAKE MAINTENANCE A HABIT

All batteries require at least some of the steps above. Even Crown forklift batteries, which are manufactured using heavier plates and more active material – for maximum durability and life – require proper maintenance to extend lifespan.

Fortunately, it's easy to build a consistent forklift maintenance routine.



# BROKEN FORKLIFT BATTERIES – REPLACE OR REPAIR?

If your industrial forklift battery is damaged, underperforming, or not holding a charge – you don't always have to recycle it and buy a replacement.

The simple checks below can help gauge the severity of damage – and reveal whether a minor repair can get your unit back up and running, faster and much cheaper than replacement.

## Here's a quick checklist to help determine whether to repair or replace:

### 1. CHECK CABLES AND CONNECTORS

First, ALWAYS disconnect the battery from the charging unit and the forklift, for safety.

Second, visually inspect the battery top, along with all cables and connections, for corrosion and loose connections.

Third, where possible, remove any corrosion. Wear PPE and follow the recommendations outlined in Crown's "Safety First Guide."

Fourth, test connections by gently pulling on them and flexing the cable back and forth.

#### Here's what to look for:

**REPAIR:** Loose connections may be able to be repaired quickly by replacing a contact or connector.

**REPAIR OR REPLACE:** Stiff wires or swelling at battery connection points are signs that full replacement or repair may be necessary. Note that fusing or lead burning the cable terminations always requires trained, professional assistance and full PPE.

### 2. ANALYZE VOLTAGE

Ordinary DC voltmeters can provide voltage readings, but only the crudest of cell indications.

**IMPORTANT:** Before performing this step, ALWAYS confirm that you've disconnected the battery from the charging unit and the forklift.

When measuring an entire row of cells, a difference of a volt or more may identify an issue with a cell in that row. That's why it's best to get a voltage reading under the load on a fully charged battery.

For lift trucks, the mast must be tilted back against a stop to provide a short, high-amperage load onto the battery. After doing so, observe the voltage results of each cell or group of cells.

**WHEN TO REPAIR OR REPLACE:** If any cells drop under 1.70 volts, they are suspect for problems.

### 3. REVIEW SPECIFIC GRAVITY LEVELS

Specific gravity is another important measurement of a battery's state of charge and electrochemical health.

A hydrometer provides these readings and helps identify cells that are falling out of line with the rest of the battery. Normal ranges are between 1.150 discharged and 1.290 when fully charged.

**WHEN TO REPLACE:** If the meter shows a lower specific gravity than the others (usually around 25 points of difference), it indicates a failing unit that may need replacement.



# **BROKEN FORKLIFT BATTERIES – REPLACE OR REPAIR?** CONTINUED

## **4. SMELL IT**

If you smell a strong hydrogen sulfide odor (resembles a rotten egg), that means the battery experienced damage beyond economical repair.

This smell occurs if the unit has suffered some impact to the cell containers inside the unit, requiring full replacement – or professional assistance to fix it.

Contact your battery technician for recommendations.

## **5. SMOKE**

**REPLACE:** If the battery emits smoke during charging or use, immediately disconnect it and call a professional; remove the battery or forklift from service – the battery must be replaced right away to avoid a fire.

## **6. DID THE BATTERY PASS THE OTHER TESTS?**

This checklist provides a simple method to gauge battery cell health in many situations.

If you're unable to determine the issue after these tests, the next step is conducting a complete capacity discharge test with a trained battery technician.

If your batteries are beyond repair, contact your distributor or installer right away to ensure a speedy replacement.



# HOW TO BUY

Crown Battery partners with a world-class network of full-service dealers, distributors, and business partners – so you get high-performance batteries, chargers, and value-enhancing accessories, along with comprehensive local support.



[CLICK HERE TO FIND A DISTRIBUTOR](#)



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