

PROVIDING INNOVATIVE SOLUTIONS WHICH OPTIMIZE SPACE &  
ORDER FULFILLMENT WITHIN THE SUPPLY CHAIN

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## Your Guide to Safe & Effective Battery Watering Methods

There is no question that forklift batteries are a vital part to keeping your business moving. And with today's ever increase lead prices, it doesn't pay to continually purchase new batteries.

Even though forklift batteries are a major contributor to your lift trucks life and productivity, the maintenance of these batteries are often a second thought until it is too late. When a lift truck battery is not properly maintained their life is greatly reduced and their run hours begin to get cut shorter and shorter. This will ultimately result in increased downtime and decreased productivity. However, with proper maintenance, you could increase battery life up to 25%.

Watering batteries is one of the most important tasks related to routine battery maintenance and if not done properly can lead to poor battery performance, shorter battery life, and equipment downtime.

As a lead-acid battery is used, water evaporates and needs to be replaced regularly. Neglecting to replace the water will shorten battery life and affect forklift motor brushes. Without proper battery maintenance, your operation could come to a standstill. So why aren't batteries being maintained? The answer is simple: Not only has the importance of battery maintenance been poorly understood, but watering each battery by hand is a dangerous hassle that can take upwards of 20 minutes per battery.

Overall, battery maintenance is a critical element to keeping your lift truck fleet up and running at an optimum level. This publication is intended to provide you with some tips and information on how to properly perform battery watering.



# Battery Watering - Importance & Safe Methods

During the last 20% of a battery's charging cycle, the water in the electrolyte breaks down into hydrogen and oxygen gasses that bubble to the surface and escape through the vent caps on each battery cell. The result, after repeated charge cycles, is an incremental dehydration of the electrolyte. Therefore, H<sub>2</sub>O must be replenished periodically by watering the battery.

**CAUTION:** Only those personnel properly trained in the watering of lead acid batteries should be allowed to do so.

When watering a battery, wear a face shield, plastic or rubber apron and gloves. Some general rules to be followed, not only during battery watering, but at all times where a motive power battery is concerned: do not smoke, use an open flame or create arcs or sparks in the vicinity of a battery. Only charge a battery in a well-ventilated area with the cover of the battery or compartment raised for maximum ventilation. Remember that motive power batteries are electrically live at all times, regardless of their state of charge.



Reference EnerSys publication Section 28.00 (INSTRUCTIONS FOR INSTALLATION, OPERATION AND MAINTENANCE OF LEAD-ACID BATTERIES IN MOTIVE POWER SERVICE) for EnerSys Motive Power lead-acid battery care instructions.

The need to add water may vary from weekly to quarterly depending on application, battery temperature, and battery design. To extend this interval to the maximum period possible, follow these steps:

1. Adjust watering gun to fill to maximum possible height, or use a single point watering system such as BIS, EZ-Fill, or Millennium, to assure consistent levels are reached in all cells.
2. Water while the battery is in finish-rate charge and gassing; ideally.
3. Do not add water until actual visual inspection shows top of separators/plates is visible.
4. A Battery Water Monitor light is an excellent way to indicate when water is needed.
5. Once a repetitive routine is established, water your battery at that interval.

Ideally, water should be added to the battery when it is near the end of charge and gassing, as the electrolyte is at its maximum level during this time. Sufficient water should then be added to bring the level of the electrolyte between its upper and lower limits (see Illustration 1).

It is often inconvenient or impossible, however, to be present during the gassing stage of charge to perform watering. In this case, water as soon as possible after the termination of charging, as the levels will still be near the maximum and the danger of over or under-watering is minimized. Fill to the lower limit in this case (see illustration 1).

**Under-watering:** If electrolyte levels are not kept high enough, portions of the battery plates will go unused; the battery will overheat and gas more violently when charging; and the exposed portions of the plates will eventually dry-out and become permanently damaged.

WATER IMPURITY CHART	
REQUIREMENTS	PARTS PER MILLION (PPM)
Total Solids	350.00
Fixed Solids	200.00
Organic and Volatile	150.00
Iron	4.00
Chloride	25.00
Ammonium (NH <sub>4</sub> )	5.00
Nitrates (NO <sub>2</sub> )	10.00
Nitrates (NO <sub>3</sub> )	10.00
Manganese	0.07
Calcium & Magnesium	40.00

**Over-watering:** If too much water is added to the cell, electrolyte will overflow during recharge as it is expelled from battery plates. This results in diluted electrolyte which reduces battery capacity (runtime), and can damage floors and other equipment exposed to the overflowing electrolyte. The battery will require acid adjustment by a factory trained professional.

Use only approved water—distilled, de-mineralized, or tested for use in batteries. Never add acid, commercial additives or other foreign material to the battery; adding such substances may void your warranty. See the Water Impurity Chart for limits on allowable impurities. Wall mounted deionizers are also available from your battery service professional.

Battery watering does not have to be complicated. For the best results, contact your battery service professional for a review and discussion of battery maintenance practices specific to your operation. Only those personnel properly trained in the watering of lead acid batteries should be allowed to do so.



## Products To Help You Get The Job Done Right

- **REGULATED HOSE SUPPLY:** The Regulated Hose Supply provides an inexpensive option compared to pump operated units yet still allows for fast filling. Installation couldn't be easier, simply attach to any garden hose bib.
- **FLOW INDICATOR:** A flow indicator built into the water supply tells the operator when filling has been completed
- **HOSE END ASSEMBLY:** Works with the flow indicator to provide precise battery watering.
- **PURGER:** Check flow rate by mating purger with hose
- **COUPLER:** Designed to be robust enough to withstand the battery watering environment. Corrosive battery acid, fluctuating temperatures, and rough routine handling are all factors that can ruin a coupler in the field and had to be considered in the design process.
- **WATER WISE FLIP-TOP WATERING CAPS:** limit the nozzle depth of automatic watering guns to achieve accurate electrolyte levels without the use of adjustable O-rings. Take the guess-work out of refilling battery cells! Simply leave the Flip-Top Watering Cap in place. Your batteries will always have the proper electrolyte levels ensuring longer life. You get peace of mind knowing that every battery cell is watered properly and safely.
- **PORTABLE WATERING CART:** These carts are ruggedly constructed of lightweight yet strong polyethylene plastic, and features a large 22 gallon holding capacity. This cart also features a large refill hole with screw-on cover to keep out particles.
- **LEVEL INDICATORS:** accurately monitor and display the status of cell electrolyte levels with a solid green or flashing red light.

If you are in need of these items or anything else to help in the care of your batteries, contact Associated by calling (877) 638-8002 today!

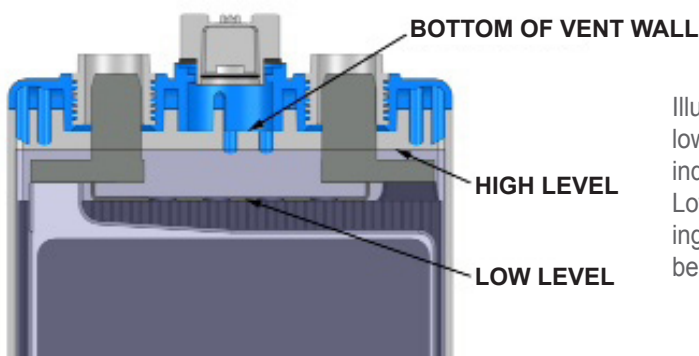


Illustration 1: Sketch showing permissible high and low limits of electrolyte level. High level marker indicates proper level immediately after charging. Low level marker indicates immediately after charging watering is required. The high level line is 1/4" below the bottom of the vent well.



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## About Associated

Celebrating over 50 years of providing customers with innovative solutions that optimize space and order fulfillment operations within their supply chain, Associated understands that handling materials in the supply chain should be more than material handling. By utilizing their unparalleled experience and industry best practices they are able to evaluate current methods and processes for storage, order fulfillment, labor and equipment utilization and recommend practical strategies to enhance their effectiveness and reduce overall cost.

Featuring leading-edge engineering, fleet optimization and labor management solutions to complement industry-leading sales, service, rentals and parts, Associated has been the recipient of multiple awards in recognition of being a premier organization in the supply chain industry.

## The Content Of This Publication Was Brought To You By EnerSys

EnerSys, the global leader in stored energy solutions for industrial applications, manufactures and distributes reserve power and motive power batteries, battery chargers, power equipment, battery accessories and outdoor equipment enclosure solutions to customers worldwide. Motive power batteries and chargers are utilized in electric forklift trucks and other commercial electric powered vehicles. Reserve power batteries are used in the telecommunication and utility industries, uninterruptible power supplies, and numerous applications requiring stored energy solutions including medical, aerospace and defense systems. Outdoor equipment enclosure products are utilized in the telecommunication, cable, utility, transportation industries and by government and defense customers. The company also provides aftermarket and customer support services to its customers from over 100 countries through its sales and manufacturing locations around the world.