



An Extended Guide · No. 1668

LiFePO4 vs Lead-Acid vs AGM

An honest,
plain-English comparison

Tech Made Simple — Service Made Personal

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! Read this first — a few battery-safety basics

A battery stores a lot of energy in a small package, so a few plain habits keep everyone safe — no matter the chemistry. Charge with the charger made for that exact battery, on a hard, non-flammable surface, and never charge one that is swollen, cracked, leaking, hot, or wet. Keep batteries away from open flame, sparks, and high heat, and give a lead-acid battery plenty of fresh air while it charges, because it can give off explosive hydrogen gas. Never puncture, crush, short the two terminals together, or throw a battery in a fire. Around lead-acid batteries wear eye protection — the acid inside can burn skin and eyes. And when any battery finally wears out, it does not belong in the household trash: batteries are recycled at the right drop-off, never thrown away. The reassuring part is that the LiFePO₄ chemistry — also written LFP — inside most of today's power stations and backup batteries is one of the safest and most stable there is. Because this guide compares three chemistries, remember that each one — flooded lead-acid, AGM, and LiFePO₄ — has its own charging and handling needs, so always follow the instructions for the exact battery in front of you.

Three batteries, one honest comparison

There is no single best battery — there is only the best battery for a particular job. This guide puts the three you will actually run into side by side, and tells you the honest truth about each.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. The question I hear most often is some version of 'which battery should I get?' — and folks are usually surprised that my answer starts with a few questions back, not a name. That's because the right choice depends on what you need it to do.

So let's do this the fair way. We'll meet the three contenders, then walk them through the categories that matter — cost, weight, life, usable capacity, upkeep, safety, and how hard you can push them — and let you decide. I sell no batteries and earn no commission, so you're getting straight talk, not a sales pitch.

★ There's no wrong question here

If any of the terms trip you up, that's normal — they trip everybody up at first. Call or text me at (330) 200-8042 and I'll walk you through it at your pace.

The whole comparison, on one page

If you read nothing else, here's the honest shape of the matchup.

- ❑ There's no single best battery — there's a best battery for each job.
- ❑ Flooded lead-acid is the cheapest to buy, but it's heavy, shorter-lived, and needs the most care.
- ❑ AGM is sealed lead-acid — no watering and it shrugs off vibration, but it's still heavy with a shorter life.
- ❑ LiFePO4 (LFP) costs the most upfront but is light, long-lived, deep-discharge friendly, and low-upkeep.
- ❑ LiFePO4 often costs less over its whole life, despite the higher sticker price.
- ❑ Match the battery to the job, your budget, and how hard you'll use it.

✓ Keep this page handy

You don't have to hold the whole comparison in your head. Skim it once, then come back to the round that matters for your decision.

Meet the two lead-acid cousins

Two of our three contenders are actually the same family. Lead-acid is the original rechargeable battery, and it comes in two flavors worth telling apart.

Flooded lead-acid — the classic

This is the old, proven, least-expensive kind — the sort in most cars and plenty of budget backup setups. It works well and it's everywhere. The trade-offs are real, though: it's heavy, it needs occasional distilled-water top-ups, and it must charge where there's fresh air, because a flooded battery gives off explosive hydrogen gas while charging.

AGM — the sealed upgrade

AGM stands for absorbed glass mat. It's still lead-acid inside, but sealed and spill-proof, so there's no watering to do and it handles vibration and tipping far better. It costs more than a flooded battery but less than lithium — a tidy middle ground. It's still heavy, though, and still has lead-acid's shorter life.

And the modern challenger: LiFePO4

The third contender is a branch of the lithium family — and it's the one in most of today's power stations and home backup batteries.

LiFePO4 (say 'life-o-four'), or LFP for short, gives up a little of the ultra-compact size you'd find in a phone battery, and in exchange it's far more stable and much longer-lived. That's exactly the trade you want in something that holds energy in your home.

- Light for the amount of energy it holds.
- Long-lived — many more charge-and-use cycles than lead-acid.
- Happy being used deeply, again and again.
- Very stable and safe, with a built-in safety brain (the BMS).
- Low maintenance — no watering and little fuss.

✓ Why the odd name?

LiFePO4 is just the chemistry's recipe — lithium, iron, phosphate. You'll see 'LFP' used to mean the same thing. Both are a good sign on a spec sheet.

Why there's no universal winner

It would be simpler if I could just name one and be done. But an honest answer has to admit that each battery earns its keep somewhere.

Lead-acid wins on the lowest upfront price. AGM wins on sealed, no-fuss convenience for the money. LiFePO4 wins on life, weight, usable capacity, and low upkeep. None of them wins every round, so the smart move is to figure out which rounds matter most to you.

Think of it like choosing a vehicle. A little runabout, a work truck, and a comfortable sedan are all 'the best' — for different drivers and different days. Batteries are the same. The rest of this guide walks the rounds so you can see where each one shines.

★ I answer with questions first, on purpose

When you ask me which battery to buy, I'll ask what you want it to run, how often, and how much you can lift. That's not me dodging — it's the only honest way to point you right.

Round 1: upfront cost

The price on the shelf is where lead-acid still lands its cleanest punch.

Dollar for dollar at the register, flooded lead-acid is the cheapest way to store a given amount of energy, with AGM a step up, and LiFePO4 the priciest to buy. If your budget is tight today, that difference is real and worth respecting.

- **Flooded lead-acid:** lowest upfront cost.
- **AGM:** more than flooded, less than lithium — the middle.
- **LiFePO4:** highest sticker price of the three.

✓ Sticker price isn't the whole story

A cheaper battery you replace several times can cost more in the end than one long-lived battery. We come back to 'value over its life' in a later round — it's where the math often flips.

Round 2: weight

This round isn't close — and for a lot of the folks I help, it's the one that decides everything.

For the same amount of usable energy, lead-acid and AGM are heavy, often strikingly so, while LiFePO4 is dramatically lighter. If you'll be carrying a battery, lifting it onto a shelf, or moving a power station room to room, weight stops being a spec and starts being your back.

- **Flooded and AGM:** heavy — plan how you'll lift and move them.
- **LiFePO4:** much lighter for the same usable energy.

! Lifting a heavy battery is a real hazard

A big lead-acid battery can be an awkward, back-straining load. Get help, lift with your legs, and never wrestle one down from a high shelf alone. If weight is a worry, that alone can be reason enough to choose LiFePO4.

Round 3: how long it lasts

Here's where LiFePO4 quietly earns back its higher price.

A battery's working life is often counted in cycles — one charge and use is one cycle.

LiFePO4 delivers many more cycles than lead-acid, typically several times as many, and it tends to hold up better over the calendar years too. Lead-acid and AGM are proven, but they simply tire out sooner.

I won't quote you a number of years or cycles, because it depends on the exact battery and how it's treated — and any specific figure belongs to that product's own spec and warranty. Read those, and you'll see the gap for yourself. Our warranty-and-lifespan guide explains what the paperwork covers.

✓ This is why 'cheaper' can cost more

If one LiFePO4 battery outlasts several lead-acid ones, the pricier battery can be the frugal choice over time. Value over its life is the number that matters, not just the sticker.

Round 4: usable capacity

Two batteries can share the same number on the label and still give you very different amounts of real, usable energy.

Every battery has a 'rated' capacity, but you can't always safely use all of it. With lead-acid and AGM, you should only draw down part of the rating — draining them deeply, over and over, wears them out fast — so the usable share is smaller than the label suggests. With LiFePO4, most of the rating is genuinely usable.

That means a lithium battery often does more real work than its number alone hints, and a lead-acid battery does a bit less. It's a quiet but important difference when you're comparing two batteries. Our capacity guide (amp-hours vs watt-hours) digs into how to read this right.

✓ Compare usable energy, not just the label

When you weigh two batteries, ask how much of each you can actually use — not just the headline rating. It's the fair way to compare.

Round 5: maintenance and upkeep

How much fuss a battery asks of you varies a lot across the three.

Flooded lead-acid — the most hands-on

A flooded battery needs its distilled-water level checked and topped up so the plates stay covered, it wants a good clean at the terminals, and it must charge with ventilation. None of that is hard, but it's regular, and it calls for eye protection around the acid.

AGM and LiFePO4 — the easy keepers

AGM is sealed, so there's no watering — just the right charger, clean terminals, and a full charge when stored. LiFePO4 asks even less: its built-in BMS handles the worrying, and there's nothing to water. If 'set it and mostly forget it' appeals to you, these two are the ones.

✓ Match the upkeep to your patience

Be honest about how much tending you'll actually do. A battery that needs care it won't get is a battery that dies early.

Round 6: safety

All three are safe when used correctly — but their risks are different, and knowing which is which keeps you out of trouble.

LiFePO4 stands out for being especially stable and very hard to overheat, which is a big reason it's chosen for power stations and home batteries. Lead-acid's main safety note is the explosive hydrogen gas a flooded battery gives off while charging, plus the acid inside. AGM is sealed, which tidies up the spill and much of the venting worry.

- Give a flooded lead-acid battery fresh air while it charges, and keep sparks and flame away.
- Wear eye protection around lead-acid — the acid can burn skin and eyes.
- Never let a metal tool bridge both terminals; that short can spark and burn.
- A lithium battery that's swelling, hissing, or very hot is telling you to stop and stay away.

! A swollen or hot battery is a stop sign

With any lithium battery, puffy, hissing, smoking, or very hot means stop now: don't use it, don't charge it, don't puncture it, and keep it away from anything that burns. For anything past the mildest case, get everyone out and call 911 — don't fight a battery fire yourself.

Round 7: deep-discharge tolerance

This round is about how hard you can lean on a battery — how far down you can run it without hurting it.

Lead-acid and AGM don't like being drained deep. Do it often and they wear out quickly, and a lead-acid battery left sitting empty can quietly ruin itself. LiFePO4 tolerates deep discharge far better, and its BMS steps in to stop it from going dangerously low.

This matters most when you'll actually use a lot of the battery each time — a long outage, a full day off-grid, steady deep-cycle work. If that's you, LiFePO4's toughness under deep use is worth a great deal. If the battery mostly sits topped up as standby, lead-acid handles that just fine.

✓ Shallow sips beat deep gulps

For any battery, topping up before it runs low is kinder than running it to empty every time — and it's most important of all for lead-acid.

Two kinds of homes, two sets of needs

The three chemistries don't change, but which one fits best often comes down to where you live and how long your outages tend to run.

If you live in town or the suburbs

In town or the suburbs, outages tend to be shorter, so you're often bridging a few hours rather than days — and you can recharge from the wall in between.

- A lighter LiFePO4 power station is easy to move room to room and tuck in a closet.
- For a battery that mostly sits ready, an AGM keeps upfront cost down with no watering.
- Shorter outages mean you rarely drain a battery deeply, which is kinder to lead-acid.
- Stores and recycling drop-offs are close, so replacing a tired battery is simple.

If you are out in the country on a well

Out in the country on a private well, outages run longer, and when the power stops the well pump stops — so no running water until it's back. That pushes you toward more capacity and deeper cycling.

- Longer, deeper use each outage is exactly where LiFePO4's deep-discharge tolerance pays off.
- If you go lead-acid out here, size it generously — repeated deep draining is hard on it.
- Barns and outbuildings swing hot and cold, and heat is hard on every chemistry, so mind where the battery lives.
- Stores and recycling are farther off, so lean toward a long-lived battery and keep the right charger on hand.

★ Not sure which fits your home?

That's one of my favorite kitchen-table questions — no sales pitch, just an honest look at your outages and your must-run list. Call (330) 200-8042.

The scorecard, at a glance

Here's the whole matchup boiled down to one honest line apiece.

Battery	The honest one-liner
Flooded lead-acid	Cheapest to buy, but heavy and it needs watering and regular care.
AGM (sealed lead-acid)	Sealed and no-fuss, still heavy, still a shorter life — a tidy middle ground.
LiFePO4 (LFP)	Costs more upfront, but light, long-lived, deep-use friendly, and low-upkeep.

No single row is the 'right' answer — the right answer is whichever line best matches what you need. The next few pages help you find it.

Where AGM fits (the useful middle)

AGM gets overlooked in the lead-acid-versus-lithium shouting match, and that's a shame, because for some jobs it's the sweet spot.

AGM keeps lead-acid's lower upfront cost while erasing its most annoying chore — the watering — and its spill and venting worries. It also handles vibration and being jostled, which is why it turns up in vehicles, boats, and many UPS backup boxes.

- You want lead-acid pricing but no watering to remember.
- The battery will get bumped or vibrated (a vehicle, a boat, a cart).
- It'll mostly sit as standby backup, kept charged.
- You're replacing an AGM that came in a device and want a like-for-like.

✓ AGM is still lead-acid at heart

It's easier to live with than a flooded battery, but it shares lead-acid's weight, shorter life, and dislike of deep draining. Judge it by that, not by the 'sealed' label alone.

When lead-acid still makes sense

Lead-acid isn't obsolete — far from it. For the right job it's still a sensible, honest choice.

- **Your budget is tight today** and the lowest upfront cost is what matters most.
- **The battery mostly waits** as standby backup rather than getting cycled hard every day.
- **You already own the charger** and gear built around lead-acid.
- **It's a starting battery** for an engine — a job lead-acid was born for.
- **Weight isn't a problem** where it'll live and you won't be hauling it around.

If several of those describe you, don't let anyone talk you out of lead-acid on principle. Just go in knowing its habits — keep it charged, don't drain it deep, and give a flooded one air — and it'll serve you well.

When LiFePO4 earns its keep

For most modern backup uses, LiFePO4 is the one I point people toward — and here's when that extra upfront cost clearly pays off.

- **You'll cycle it often or deeply** — daily use, long outages, off-grid days.
- **Weight matters** — you'll carry it, lift it, or move a power station around.
- **You want it to last** and would rather not replace a battery again soon.
- **Low upkeep appeals** — no watering, and a BMS doing the worrying.
- **You value the safety margin** of an especially stable chemistry.

If the battery is the heart of a power station or a home backup system, LiFePO4 is almost always the one worth paying for. That's why the makers of that gear chose it — more on that in our guide on why LiFePO4 dominates.

How to match the battery to the job

Here's the simple way I walk folks through the decision at their kitchen table.

Start with the job, not the chemistry. Name what you want the battery to do, how often and how hard you'll use it, how much you can lift, and what you can spend. Once those are clear, the right chemistry usually picks itself.

- Cheapest upfront, mostly standby, weight is fine: lead-acid or AGM.
- Sealed and no watering, but still budget-minded: AGM.
- Long life, light weight, deep or daily use, low upkeep: LiFePO4.

★ Bring me your must-run list

Tell me what you'd want to keep running in an outage and I'll help you match a battery to it — honestly, with nothing to sell. A first visit is a flat \$99, and I can often help right on your screen for \$49.

A few myths worth clearing up

This particular matchup collects some tall tales. Here are the ones I hear most, set straight.

- **'Lithium batteries all catch fire.'** The stable LiFePO_4 kind is very hard to set off; the rare scary stories usually involve damaged or cheap cells of a different lithium type.
- **'Lead-acid is obsolete.'** Not at all — it's still the cheapest upfront and just right for plenty of standby jobs.
- **'AGM is maintenance-free, so I can ignore it.'** No watering, true — but it still wants the right charger and a full charge, and it still ages.
- **'More amp-hours always means more battery.'** Only at the same voltage — compare watt-hours to be fair. Our capacity guide explains why.

✓ When in doubt, follow the label

The maker's own instructions beat any rule of thumb — including mine. If the label and a myth disagree, the label wins.

Common Questions

The questions I hear most when folks are choosing between the three.

Q: Is one of these the clear winner?

No — and anyone who says so is probably selling something. Lead-acid wins on upfront price, AGM wins on sealed no-fuss convenience for the money, and LiFePO4 wins on life, weight, and low upkeep. The right pick is the one that fits your job and budget.

Q: Is AGM a kind of lithium?

No. AGM is a sealed, spill-proof type of lead-acid — the letters stand for absorbed glass mat. It's still lead-acid inside, just tidier and lower-maintenance than the old flooded kind.

Q: Why is LiFePO4 more expensive to buy?

You're paying for a much longer life, lighter weight, more usable capacity, and a built-in safety brain. Spread over the years it lasts, it often costs less than replacing cheaper batteries again and again.

Q: Which one is the safest?

All three are safe used correctly. LiFePO4 stands out for being especially stable and hard to overheat. Lead-acid's main note is the hydrogen gas a flooded one gives off while charging — so give it air and keep flame away.

Q: Can I just swap a lead-acid battery for a LiFePO4 one?

Sometimes — there are LiFePO4 'drop-in' replacements — but not always. The charger and the device may expect lead-acid, so check that everything is compatible first. When in doubt, ask the maker or give me a call.

★ Still weighing it up?

Call or text (330) 200-8042 and tell me your situation. I'll give you my honest read — there's no such thing as a silly battery question.

A simple way to choose

If it still feels like a lot, work down this short list and the answer tends to appear.

- ❑ Name the job first — starting, deep-cycle use, or standby backup.
- ❑ Set your budget: lowest upfront (lead-acid or AGM), or best value over time (LiFePO4).
- ❑ Weigh how much you'll lift and carry — LiFePO4 is far lighter.
- ❑ Decide how hard you'll use it — deep, daily draining favors LiFePO4.
- ❑ Consider upkeep — flooded needs watering; AGM and LiFePO4 don't.
- ❑ When it's close, read both labels and compare watt-hours, not just amp-hours.

✓ Tape this list inside a cabinet door

You don't have to memorize it. A printed copy where you keep your battery gear is worth a dozen remembered facts.

You don't have to do this alone

You just have to remember that a friendly, patient person is one call away.

I hope this guide made choosing between LiFePO4, lead-acid, and AGM feel a little less daunting and a lot more doable. Keep it in a drawer with your other home papers, come back to a page whenever you need it, and don't worry about memorizing anything.

When you'd rather have a hand, that's exactly what I do. I come to your home, work at your pace, and never make you feel rushed or silly for asking. A first visit is a flat \$99, and for the parts that don't need me on-site I can often help right on your screen for \$49. Every visit comes with a 30-day, come-back-free guarantee. I don't do licensed electrical work or open up sealed battery packs myself — for anything hardwired, or for panel work, I'll help you line up a trustworthy local pro.

★ Bill's Home Tech — real help, close to home

Call or text me at (330) 200-8042, or visit BillsHomeTech.com. Serving Atwater and all of Portage County. 30+ years of patient, plain-English tech help — and if you're ever not 100% happy with a visit, I'll make it right or refund it. That's a promise. — Bill

The Three, Side by Side

Lead-acid (flooded), AGM, and LiFePO4

	Flooded	AGM	LiFePO4
Upfront cost	Cheapest	Middle	Highest
Weight	Heavy	Heavy	Light
Lifespan	Shorter	Shorter	Much longer
Deep use	Hard on it	Hard on it	Handles well
Upkeep	Watering	Sealed	Very low
Safety	Good	Good	Very stable

Flooded and AGM are both lead-acid. Match the battery to the job.

Matching a Battery to the Job

Four questions that point you to the right one



The best fit depends on your job, budget, and how hard you use it.

Pick by What Matters Most

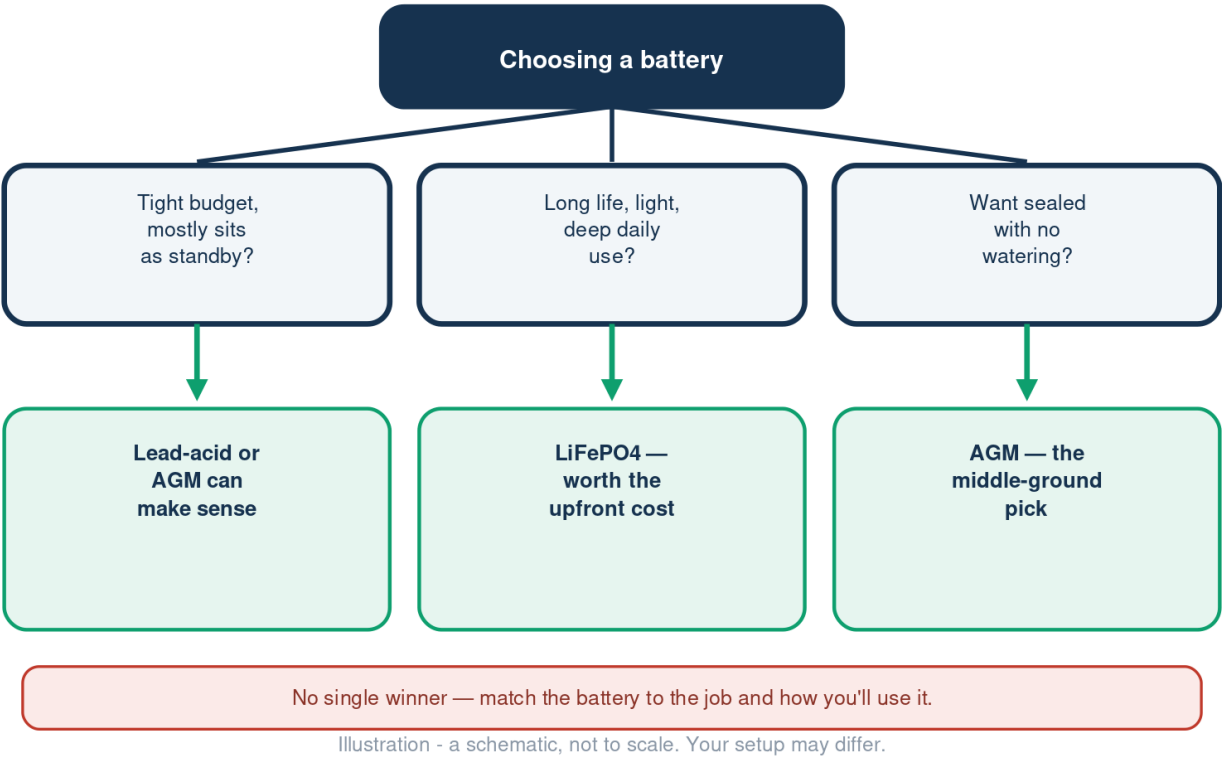
Start with your top priority

	Best pick	In a nutshell
Lowest price	Flooded	Cheapest upfront
No-fuss, sealed	AGM	Sealed lead-acid
Longest life	LiFePO4	Many more cycles
Lightest weight	LiFePO4	Light for energy
Deep daily use	LiFePO4	Built for it

No single winner — pick by what matters most to you.

Which Battery Fits Your Job?

A starting point, not the final word





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A Note From Bill

A quick note from Bill.

I write these guides to make home tech a little less frustrating, and I do my best to keep every step accurate and up to date. Still, every home, device, and setup is a bit different, so I can't promise a guide will match yours exactly or fix your particular problem. These guides are for general information only — they're not professional, legal, or financial advice, and they don't replace your device's own manual or the manufacturer's instructions. Please go slow, use your own good judgment, and use everything here at your own risk. If a step involves electrical wiring, a gas appliance, a water heater, plumbing, or climbing a ladder — or if anything just doesn't feel safe — please stop and call a licensed professional (or give me a call at 330-200-8042). Bill's Home Tech and Bill Davis can't be responsible for any damage, data loss, or injury that comes from using these guides. Thanks for reading, and stay safe out there.

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