

Having the right batteries can make a big difference in how much you enjoy your time on the water

BY ALLAN TARVID

arine 12-volt batteries are purpose-built, so the first thing to ask yourself before you start shopping for one is how you plan to use it. Whether the battery is a flooded-cell, AGM (absorbed glass mat) or a gel design, buying a battery that's not designed for the purpose you have in mind means getting less performance, a shorter service life or both. It's a waste of money, any way you look at it.

With this in mind, let's look at each category of marine batteries available today to determine which type or types will serve as the best "cell mates" for your boat.



STARTING BATTERIES

Unless you have a small, pull-start outboard, your boat needs a battery to start the engine. The cranking or starting batteries in our comparison chart (page 24-25) are designed expressly for this purpose, and then act as a sort of buffer while the engine's alternator carries the boat's electrical load.

A starting battery delivers the sudden burst of starting power, and afterward it takes it easy until it's time to crank the engine again. The engine's charging system keeps the battery up while boating, and only a minimum charging is usually needed after an outing.

If you plug in a multibank on-board charger at the end of the day, the starting battery's charge status light is usually the first to indicate a full charge.

The most important rating on a starting battery's label is CA (cranking amps) or MCA (marine cranking amps). Both tell you how many amps a new, fully-charged battery at 32 degrees (F) can deliver for 30 seconds without falling below 7.2 volts. This number is important because it must meet or exceed the required number of cranking amps listed in your engine's owner's manual.

If your manual only shows a Cold Cranking Amp (CCA) rating and you are looking at batteries that only show a CA or MCA rating, you can convert one to the other with the simple formula (MCA \times 0.8 = CCA) or conversely (CCA \times 1.2 = MCA).

CCA is the automotive standard and it is calculated using the same test as CA/MCA, but done at zero degrees (F). The CA/MCA number is always higher because batteries are more efficient at the warmer 32-degree temperature than they are at zero.

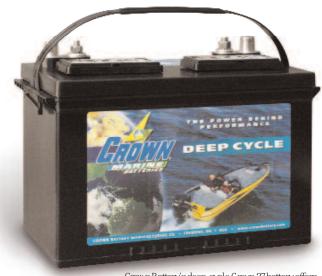
DEEP-CYCLE BATTERIES

Designed to power accessories such as lights, electronics and pumps, the marine deep-cycle batteries in our chart are at the opposite end of the spectrum from starting batteries.

"Deep cycle" describes the ability to be deeply discharged before being recharged. These deep discharge/recharge cycles are hard on battery plates, making it necessary to design deepcycle batteries with fewer, but thicker plates than those used in starting batteries.

Fact is, starting batteries usually only survive a few deep cycles, while deep-cycle batteries with a suitable MCA or CCA rating for your engine can be used as permanent starting batteries.

The most important ratings on a deep-cycle battery's label



Crown Battery's deep-cycle Group 27 battery offers 170 reserve capacity m inutes and 115 amp hours.

are RC (reserve capacity minutes) and AH (amp hours). The RC rating is more accurate when the battery is used for high amp-draw devices such as trolling motors and windlasses. The AH rating gives a clearer picture of how long a battery can carry lighter loads, such as when it is used as a



house battery to power lights and electronics.

The RC rating is the number of minutes that a new, fully-charged 12-volt battery at 80 degrees (F) can carry a 25-amp load and maintain a minimum voltage of 10.5 volts. The AH rating tells you the number of amps that a new 12-volt battery at 80 degrees (F) can deliver, multiplied by the number of hours, without falling below 10.5 volts.

For instance, a 100AH battery can deliver five amps for 20 hours because $5 \times 20 = 100$. The AH figure for most marine deep-cycle batteries is calculated at a 20-hour discharge rate, and this is important because the amount of amps a battery can produce is not strictly a linear measurement.

The higher the amp draw, the fewer total amps a battery can deliver. A 100AH battery can deliver five amps for 20 hours, but it cannot deliver 25 amps for four hours even though 25 x 4 also equals 100.

We can see proof of this in our battery chart by comparing the manufacturer's AH and RC numbers. For example, Trojan's

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SCS150 is rated at 100AH and 150RC minutes. Since RC minutes are calculated using a 25-amp discharge rate, this battery can only carry that 25-amp load for 150 minutes (2.5 hours). If all amp ratings were truly linear, a 100AH battery could carry that 25-amp load for four hours (240 minutes).

What all this means is that if you are adding up the small loads that your boat's house battery will carry, you should choose a battery with an AH rating high enough to meet your needs. If you are looking for batteries to run your trolling motor, RC minutes will come closer to showing actual motor running time than amp hours.

DUAL-PURPOSE BATTERIES

So what if you need a battery that can both crank your engine and run your accessories? This calls for checking out the dual-purpose batteries in our chart. These batteries have enough plate surface area to crank your engine quickly, with battery plates tough enough to withstand moderate deep cycling.

Dual-purpose batteries came about decades ago when small freshwater fishing boats had room for only one battery to start the outboard and run the trolling motor.

They still meet that need today, but they also can start the engine on any boat and power marine stereo systems or other entertainment electronics when the engine isn't running.

A dual-purpose battery must still meet your engine's CCA or MCA requirement, and exceed it if you want it to have enough juice left to crank your engine after pumping out a few hours of your favorite tunes.

Big, tsunami-inducing stereo amplifiers may not leave you with enough power to start your engine after entertaining a raft

AGM SPIRALCELL TECH

There are now two battery companies offering AGM spiralcell technology—Exide and Optima. Here's a look at the key features and benefits of the Optima system

Sprialcell Technology =

Patented design provides superior performance and extended life

Solid Cast Cell Connections

Connections allow for increased durability and maximum plate height

Tightly Compressed Cells =

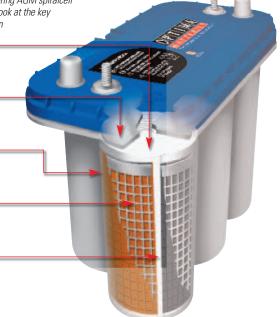
Each cell is compressed in a sealed case for extra vibration resistance

99.9 Percent Pure Lead -

Optima's Spiralcell design allows for lead to be used in its purest form

Absorbent Glass-Mat Separators

To eliminate acid spilling, these hold electrolyte like a sponge



of boats. High-powered audio systems are often best served by a separate deep-cycle battery system.

BATTERY TECHNOLOGIES

Once you are sure you've chosen the right type of marine battery for your purpose, you are halfway through selecting the right one for your boat.

The next step is choosing the type of battery technology you want on your boat. Batteries for all three purposes are available in flooded-cell, AGM or gel designs.

All three designs will work, but budget, the amount of battery weight your boat can handle and the amount of maintenance you are willing to perform all have a bearing on which technology you choose.

FLOODED-CELL BATTERIES

Flooded-cell batteries are the least expensive and often the lightest design for a given capacity rating. They come in full-maintenance and maintenance-free versions.

The full-maintenance models must be cleaned and watered regularly. The tops of their cases collect a caustic residue from the normal gassing that occurs during recharging. This gunk can build up thick enough to pass a low-grade current "leak" between the posts and rob a small amount of battery capacity. The residue also can speed corrosion on battery posts and terminals if they are not coated with a protective spray or grease.

Water is lost from the electrolyte during

THE MARINE BATTERY OF TOMORROW

Tomorrow's marine batteries will be lighter, smaller and perhaps even smarter than those we use on our boats today.

One company headquartered in Germany, Torqeedo (815/444-8806; torqeedo.com), isn't waiting for someone else to lead the way and has introduced lithium manganese batteries optimized for its line of electric outboards.

New this year, Torqeedo's

Power 26-104 battery uses a technology more common to computers and smart phones than to boats. Designed to run Torqeedo's 24- and 48-volt motors, the battery has a nominal voltage of 25.9 volts and a nominal charge of 104 amp hours.

The battery weighs just 44 pounds; an impressive fact considering it could replace two 12-volt, lead-acid batteries that

each weigh more. The battery has a built-in management system smart enough to protect it from overcharge, overvoltage, overheating, dangerously deep discharge, reversed polarity hookup and other potential problems.

It can be submerged three feet deep for 30 minutes and still function properly. Torqeedo's charger can raise the battery's charge level from zero to 100 percent in eight hours, and when stored in Deep Sleep mode, the battery's self discharge rate is an incredibly low (compared to lead-acid batteries) 1.6 percent per year.

The bad news is that the Power 26-104's suggested retail price is \$2,499, and it is considered a good buy for a battery of its size and type.

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gassing, and it must be replaced to avoid damaging the battery. If you aren't willing to do this relatively easy maintenance, choose another battery design because these batteries probably won't last a season without proper care.

AGM BATTERIES

AGM batteries are the most popular of the sealed, maintenance-free designs. They have no special charging requirements and need no more maintenance than perhaps a seasonal post and terminal cleaning.

With the electrolyte absorbed into a spongy, mat-like material, these batteries are generally similar in weight or only slightly heavier than flooded batteries of similar capacity, though some such Optima's batteries, with its exclusive Spiralcell design, can be lighter.

AGMs are sometimes smaller in size and no more expensive than high-end flooded models. They also have less internal resistance, which allows them to recharge faster and deliver power more efficiently toward the end of their discharge cycle.

The efficiency of this technology can result in a battery that acts like a more powerful model. They also lose less power than flooded models through self-discharge while being stored.

Manufacturers claim an AGM will deliver more charge/recharge cycles during

its service life than a comparable floodedcell battery, which can make up for some of the higher price.

GEL BATTERIES

Gel batteries are the least popular of the sealed, maintenance-free designs, but some boaters think they are the best. They are generally more expensive and heavier than other types with a similar capacity.

Gel battery manufacturers claim that this technology has the longest shelf life and the lowest level of self discharge. Gelled electrolyte also can't stratify as can occur with flooded-cell batteries, in which the acid-heavy electrolyte falls to the bottom of the plates. As a result, gel batteries tend to be more efficient.

NEXT STEPS

The bottom line is that battery shopping includes balancing quite a list of variables. We suggest you begin with the battery's purpose (starting/deep-cycle or both), and once you have decided what you want the battery to do, then settle on the technology (flooded-cell/AGM/gel) that suits you best.

With these decisions in hand, peruse our chart to find the battery or batteries with enough capacity to serve as a cell mate on your boat.

A marine electronics expert, Field Editor Allan Tarvid has been writing for us since the early 1990s.

BATTERY MANUFACTURER CONTACT INFORMATION

ACDelco

800/223-3526; acdelco.com

Crown Battery

419/334-7181; crownbattery.com

Deka, East Penn

610/682-4231: dekabatteries.com

Duracell

877/344-8971; driveduracell.com

Everstart

walmart.com

Fxide

678/566-9000; exide.com

Interstate Batteries

888/772-3600; interstatebatteries.com

Lifeline Battery Corp.

800/527-3224; lifelinebatteries.com

Odyssey Batteries/Trolling Thunder

800/538-3627; odysseybattery.com

Optima Batteries

888/867-8462; optimabatteries.com

Rolls Batteries

800/681-9914; rollsbattery.com

Sears DieHard

800/349-4358; sears.com

Trojan Battery Co.

800/423-6569; trojanbattery.com

NAVIGATING OUR COMPARISON CHART

The chart specifications include the best information available at press time.

PRICES

Battery prices vary according to shipping costs and the profit structure of individual dealers. Most of the prices in the chart, like those in the Trojan section, represent the manufacturers' suggested retail prices and you may save some money with a bit of careful shopping. Look around locally before you make a choice based solely on the prices listed in this chart.

NA

This means the manufacturer doesn't post a particular rating or the rating doesn't apply to a battery. Some manufacturers, for instance, don't provide cranking amp numbers for their deep-cycle batteries or state RC or AH ratings for starting batteries. We estimate ratings in the chart where possible using formulas stated in the text.

BATTERY GROUP SIZE

Batteries fit into industry-standard group sizes according to their external dimensions. Knowing how large a battery is can tell you if you have enough room for it in your boat.

BATTERY DIMENSIONS BY GROUP SIZE

Group size	Length	Width	Height
34	10¼"	613/16"	7%"
24	10¼"	613//6"	8%"
24H	10¼"	613/16"	9%"
27	121/16"	613//6"	8%"
29H	13¾"	6¾"	91/8"
30H	13½"	613//6"	91/4"
31	13"	613/16"	91/16"

Batteries marked "Special" don't match a standard group size, but can add a substantial amount of capacity if you have room for them. The special batteries in our chart measure as follows:

- Odyssey Trolling Thunder PC1800-FT: 22.75" long x 4.9" wide x 12.44" high
- Odyssey Trolling Thunder PC2250: 11.26" long x 10.59" wide x 9.17" high
- Rolls T-12-136: 13.63" long x 6.75" wide x 11.63" high
- Trojan J185H-AC: 15" long x 7" wide x 14.63" high

BATTERY BUYERS GUIDE BATTERIES AT A GLANCE

BRAND	MODEL	PURPOSE	GROUP SIZE	ТҮРЕ	AH (20hr)	MCA	RC	WEIGHT (lbs.)	PRICE
ACDelco	Voyager C24MF	Starting	24	Flooded/Maint-Free	52	630	95	36.5	\$89
ACDelco	Voyager C24HP	Starting	24	Flooded/Maint-Free	74	1000	135	44.2	\$110
ACDelco	Voyager M24MF	Dual Purpose	24	Flooded/Maint-Free	86	680	140	44.6	\$106
ACDelco	Voyager M27MF	Dual Purpose	27	Flooded/Maint-Free	95	750	160	50.1	\$115
ACDelco	Voyager M29MF	Dual Purpose	29	Flooded/Maint-Free	105	945	210	58.8	\$125
ACDelco	60 Series ACDM24C	Starting	24	Flooded/Maint-Free	NA	1000	120	45.6	\$103
ACDelco	60 Series ACDM27C	Starting	27	Flooded/Maint-Free	NA	1060	125	54.4	\$105
ACDelco	60 Series ACDM24DC	Deep Cycle	24	Flooded/Maint-Free	75 (est.)	715	125	41.2	\$94
ACDelco	60 Series ACDM27DC	Deep Cycle	27	Flooded/Maint-Free	96 (est.)	845	160	49.3	\$108
Crown	MAR 500	Starting	24	Flooded/Maint-Free	45	550	65	37	\$83
Crown	MAR 600	Starting	24	Flooded/Maint-Free	50	625	75	39	\$87
Crown	MAR 800	Starting	24	Flooded/Maint-Free	65	850	105	44	\$101
Crown	MAR 1000	Starting	24	Flooded/Maint-Free	78	1000	120	46	\$112
Crown	MAR 1000X	Starting	27	Flooded/Maint-Free	80	1000	125	51	\$120
Crown	24DP550	Dual Purpose	24	Flooded/Maint-Free	75	550	85	40	\$95
Crown	31DP800	Dual Purpose	31	Flooded/Maint-Free	120	1000	180	60	\$122
Crown	24DC85	Deep Cycle	24	Flooded/Maint-Free	85	560	110	44	\$114
Crown	24DC95	Deep Cycle	24	Flooded/Maint-Free	95	730	140	50	\$125
Crown	27DC105	Deep Cycle	27	Flooded/Maint-Free	105	625	140	51	\$176
Crown	27DC115	Deep Cycle	27	Flooded/Maint-Free	115	845	170	60	\$142
Crown	31DC130	Deep Cycle	31	Flooded/Maint-Free	130	1000	200	66	\$169
Deka	Marine Master 24M4	Starting	24	Flooded/Maint-Free	NA	575	70	32	\$107
Deka	Marine Master 24M5	Starting	24	Flooded/Maint-Free	NA	650	90	35.5	\$118
Deka	Marine Master 24M6	Starting	24	Flooded/Maint-Free	NA	820	115	40	\$143
Deka	Marine Master 24M7	Starting	24	Flooded/Maint-Free	NA	1000	130	45	\$155
Deka	Marine Master 27M6	Starting	27	Flooded/Maint-Free	NA	1050	182	56	\$208
Deka	Marine Master DP24	Dual Purpose	24	Flooded Cell	65	685	140	42	\$143
Deka	Marine Master DP27	Dual Purpose	27	Flooded Cell	80	810	175	49	\$164
Deka	Marine Master DP31DT	Dual Purpose	31	Flooded Cell	100	875	205	57	\$207
Deka	Marine Master DC24	Deep Cycle	24	Flooded Cell	75	625	150	45	\$163
Deka	Marine Master DC27	Deep Cycle	27	Flooded Cell	90	715	200	53	\$188
Deka	Marine Master DC31DT	Deep Cycle	31	Flooded Cell	105	810	225	59	\$214
Deka	Dominator 8G24M	Dual Purpose	24	Gel	79.2 (est)	575	132	52.5	\$304
Deka	Dominator 8G27M	Dual Purpose	27	Gel	96 (est.)	700	160	63.2	\$366
Deka	Dominator 8G31DTM	Dual Purpose	31	Gel	108 (est.)	780	180	70	\$401
Deka	Intimidator 9A34M	Dual Purpose	34	AGM	72 (est.)	955	120	41.5	\$255
Deka	Intimidator 8A24M	Dual Purpose	24	AGM	81 (est.)	800	135	53	\$268
Deka	Intimidator 8A27M	Dual Purpose	27	AGM	105 (est.)	900	175	63	\$316
Deka	Intimidator 8A31DTM	Dual Purpose	31	AGM	120 (est.)	1000	200	69	\$350
Duracell	Extreme Power AGM34M	Dual Purpose	34	AGM	72 (est.)	955	120	41.5	\$200
Duracell	Extreme Power AGM31DC	Dual Purpose	31	AGM	120 (est.)	1000	200	69	\$250
Everstart	24MS6	Starting	24	Flooded Cell	NA	625	NA	NA	\$55
Everstart	24DP4	Dual Purpose	24	Flooded Cell	105	675	140	NA	\$65
Everstart	24DC6	Deep Cycle	24	Flooded Cell	75	500	100	NA	\$58
Everstart	27DC6	Deep Cycle	27	Flooded Cell	115	720	160	NA	\$70
Everstart	Maxx 29	Deep Cycle	29	Flooded Cell	125	875	205	NA	\$75
Exide	ORB34M-36	Starting	34	AGM/Spiral Cell	NA	950	95	38	\$247
Exide	ORB34DC-36	Deep Cycle	34	AGM/Spiral Cell	NA	935	100	41	\$267
Exide	MegaCycle MC-31	Deep Cycle	31	AGM	100	840	200	71	\$278
Exide	MegaCycle XMC-31	Deep Cycle	31	AGM	100	1110	200	68	\$302
Exide	Nautilus HD-M-24	Starting	24	Flooded/Maint-Free	NA	525	65	33	\$81
Exide	Nautilus XHD-M-24	Starting	24	Flooded/Maint-Free	NA NA	650	80	36	\$88
Exide	Nautilus XXHD-M-24	Starting	24	Flooded/Maint-Free	NA	1000	115	56.5	\$119
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Exide	Nautilus XXHD-M-27	Starting	27	Flooded/Maint-Free	NA 70	1000	180	57	\$126
Exide	Nautilus NC-24	Dual Purpose	24	Flooded Cell	70	625	120	43	\$109
Exide	Nautilus NC-27	Dual Purpose	27	Flooded Cell	100	730	160	56	\$123

BRAND	MODEL	PURPOSE	GROUP SIZE	ТҮРЕ	AH (20hr)	MCA	RC	WEIGHT (lbs.)	PRICE
Exide	Nautilus NG24	Deep Cycle	24	Flooded Cell	80	500	140	51	\$129
Exide	Nautilus NG27	Deep Cycle	27	Flooded Cell	105	675	182	60	\$151
Exide	Nautilus NG31	Deep Cycle	31	Flooded Cell	115	900	205	62	\$172
Exide	Prevailer PV-27DC	Dual Purpose	27	Gel	86	585	155	63	\$346
Exide	Prevailer PV-31	Dual Purpose	31	Gel	104	785	196	63	\$386
Interstate	24M-RD	Starting	24	Flooded Cell	NA	500	75	37	\$72
Interstate	24M-HD	Starting	24	Flooded Cell	NA	625	95	39	\$80
Interstate	24M-XHD	Starting	24	Flooded Cell	NA	1000	135	45	\$96
Interstate	27M-XHD	Starting	27	Flooded Cell	NA	1000	180	54	\$107
Interstate	HD24-DP	Dual Purpose	24	Flooded Cell	60 (est.)	505	100	41	\$80
Interstate	SRM-24	Dual Purpose	24	Flooded Cell	84 (est.)	690	140	46	\$91
Interstate	SRM-27	Dual Purpose	27	Flooded Cell	96 (est.)	750	160	53	\$97
Interstate	SRM-27B	Dual Purpose	27	Flooded Cell	108 (est.)	845	180	55	\$104
Interstate	SRM-29	Dual Purpose	29	Flooded Cell	126 (est.)	845	210	59	\$111
Lifeline	GPL-2400T	Starting	24	AGM	NA	790	NA	53	\$265
Lifeline	GPL-2700T	Starting	27	AGM	NA	900	NA	63	\$300
Lifeline	GPL-3100T	Starting	31	AGM	NA	950	NA	67	\$330
Lifeline	GPL-24T	Deep Cycle	24	AGM	80	680	149	56	\$265
Lifeline	GPL-27T	Deep Cycle	27	AGM	100	715	186	65	\$300
Lifeline	GPL-31T	Deep Cycle	31	AGM	105	750	195	69	\$330
Lifeline	GPL-30HT	Deep Cycle	30H	AGM	150	850	315	96	\$435
Odyssey*	34M-PC1500	Dual Purpose	34 (appr.)	AGM	68	1050	135	49.5	\$380
Odyssey*	31M-PC2150	Dual Purpose	31	AGM	100	1370	205	77.8	\$551
Odyssey*	PC2250	Dual Purpose	Special	AGM	126	1550	240	86	\$722
Odyssey*	PC1800-FT	Dual Purpose	Special	AGM	214	1450	475	132.3	\$957
Optima	SC34M	Starting	34	AGM/Spiralcell	50	1000	100	41	\$194
Optima	SC34DM	Dual Purpose	34	AGM/Spiralcell	55	870	120	46	\$226
Optima	SC27DM	Dual Purpose	27	AGM/Spiralcell	66	1000	140	55	\$235
Optima	SC31DM	Dual Purpose	31	AGM/Spiralcell	75	1125	155	61	\$268
Rolls	24HT80	Deep Cycle	24	Flooded Cell	80	405	163	50	\$230
Rolls	27HT90	Deep Cycle	27	Flooded Cell	90	506	203	55	\$252
Rolls	27HT 105	Deep Cycle	27	Flooded Cell	105	475	198	68	\$288
Rolls	30H-125	Deep Cycle	30H	Flooded Cell	125	500	203	73	\$370
Rolls	T-12-136	Deep Cycle	Special	Flooded Cell	136	640	277	93	\$442
Sears	DieHard 24MS	Starting	24	Flooded Cell	NA	672 (est.)	85	36	\$85
Sears	DieHard 24 Starting	Starting	24	Flooded Cell	NA	918 (est.)	135	46	\$105
Sears	DieHard 24M DC/RV	Dual Purpose	24	Flooded Cell	63 (est.)	678 (est.)	105	42	\$95
Sears	DieHard 27M DC/RV	Dual Purpose	27	Flooded Cell	81 (est.)	798 (est.)	135	57	\$115
Sears	DieHard 29HM DC/RV	Dual Purpose	29H	Flooded Cell	115	810 (est.)	200	62	\$135
Sears	DieHard Platinum 34M	Dual Purpose	34	AGM	68	1056 (est.)	135	53	\$200
Sears	DieHard Platinum 31M	Dual Purpose	31	AGM	100	1380 (est.)	205	75	\$270
Trojan	24TMX	Deep Cycle	24	Flooded Cell	85	540	140	47	\$179
Trojan	27TMX	Deep Cycle	27	Flooded Cell	105	650	175	55	\$199
Trojan	27TMH	Deep Cycle	27	Flooded Cell	115	760	200	61	\$224
Trojan	J185H-AC	Deep Cycle	Special	Flooded Cell	225	NA	440	128	\$428
Trojan	SCS150	Deep Cycle	24	Flooded Cell	100	650	150	50	\$211
Trojan	SCS200	Deep Cycle	27	Flooded Cell	115	760	200	60	\$241
Trojan	SCS225	Deep Cycle	30H	Flooded Cell	130	820	225	66	\$257
Trojan	24-AGM	Dual Purpose	24	AGM	76	600	137	54	\$269
Trojan	27-AGM	Dual Purpose	27	AGM	89	660	158	64	\$304
Trojan	31-AGM	Dual Purpose	31	AGM	100	720	177	69	\$328
Trojan	31-AGM OverDrive	Dual Purpose	31	AGM	102	720	180	69	\$277
Trojan	31-AGM TransPower	Starting	31	AGM	102	1200	200	74.5	\$349
Trojan	24-Gel	Deep Cycle	24	Gel	77	460	147	52	\$303
Trojan	27-Gel	Deep Cycle	27	Gel	91	545	179	63	\$366
Trojan	31-Gel	Deep Cycle	31	Gel	102	620	200	69	\$379

^{*}Trolling Thunder Marine models; NA – No information provided by manufacturer; Special – See battery group size sidebar on page 22 for external dimensions