

# Winter Spells Trouble for Vehicle Batteries

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We've all seen the problem. It's the dead of winter; you go to start the truck or application vehicle and hear a few grunts followed by Click- Click- Click. Wait a few seconds and try again to start it and hear, Click- Click, then silence. You rush to hook up the booster charger, select the highest charge rate, wait a few minutes and give it another try. Odds are the machine will start and you drive off to the job. Booster chargers can be a problem for on-board electronics as reviewed in my Tech Notes covering booster chargers and welding on machines and they won't do the job for properly charging the batteries.



The problem is bad enough with vehicles that are driven daily but greatly exaggerated with application vehicles where they may be inactive for several months.

My preparation for this column involved a lot of reading and researching on the internet along with a couple visits to good, locally owned auto parts stores and an extensive meeting with Kendra Reinhard at Auto-Zone in Van Wert Ohio. I asked a lot of questions, some of which I've had for years while trying to better understand any recommendations for heading off battery problems before outright replacement is needed,

This Tech Notes Column hopes to give you a better understanding of vehicle batteries while suggesting methods that will help them last longer and provide reliable performance when needed.

With the exception of new unusual technologies vehicle batteries are made up of Lead-Acid cells. A plate of lead in a solution of sulfuric acid will create an electric charge. Each lead-acid cell generates 1.2 volts of electricity. The cells are hooked together, in series, inside what we see as the battery. Plates can be added in each cell to increase the current available. Each cell remains at the same voltage but the charge or current available increases as plates are added. An additional piece of material is placed between the lead plates which keep them from shorting together.

I found at AutoZone, they could sell me 4 different lead acid batteries for my GMC pickup. They all would fit but they ranged in price from 89.95 to 189.95 and if I spent 239.95 I could get what could be called the best. My question for Kendra was, "What's the difference?" She went on about Cranking Amps, Cold Cranking Amps, Reserve Amps, Quality of Materials and Warranty". As a consumer I tend to buy the middle grade of most things but I really wanted to know why.

Cranking Amps is the specification for the battery of amps available for short burst of time. This measurement is for 30 seconds at 32 degrees "F", Fahrenheit, or 0 degrees "C", Celsius. Cold Cranking Amps is the available current at Zero degrees "F" or -18 "C".

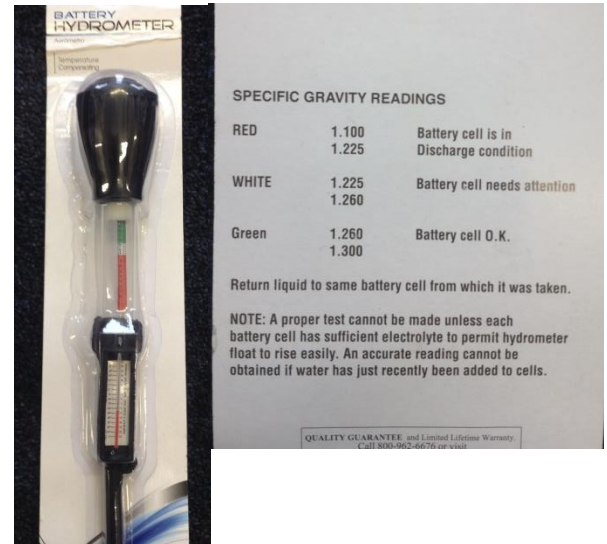
High Cranking Amp batteries have more lead plates installed to increase the charge of the battery. That means the plates are closer together in a high capacity battery. You can literally feel the weight of the battery increases along with the price. More plates = higher cost.

The material separating the plates becomes an important consideration as the plates get closer together in a high capacity battery. Higher priced batteries use better quality materials to separate the plates. In high vibration or shock conditions the cells must absorb the shock. If plates short together it will cause the battery to fail.

I spent some time at the Johnson Controls website as I found they are the manufacturer of AutoZone batteries and most other labels you might see. They talk extensively about plate construction or what they call “Mesh” constructed plates. The idea is to create a battery that can handle the shock and vibration.

When any battery sits idle it loses energy. As the energy leaves the battery cells the acidity of the liquid begins to drop resulting in less power when needed. This energy gets replenished when battery is charged. Today’s vehicles pretty well always draw some current from the battery even when they appear off.

Many of today’s batteries are sealed but vented to allow gasses to escape from the cells. The ones with removable cell plugs allow you to check the acidity using a Hydrometer. The specific gravity will indicate the acid level or charge available in the battery. In addition to distilled water you can add sulfuric to bring the level up. If your battery allows, the tools and materials are available at the auto supply.



In Agriculture many of the vehicles are not used at all for a good portion of the year. In areas like Ohio a rig may get parked in November and sit in the cold until it’s needed in late February or March. At the farming level machines may sit for months. During the months of down time the battery is constantly discharging. With all the electronics in today’s agriculture you can plan on something using just a little energy. Once completely discharged many or most lead-acid batteries won’t come back up in charge.



The best way to insure a healthy battery is to keep it charged. Use a “Maintenance Charger” also called a “Smart Charger” to keep the battery charged. Smart chargers stop charging when the battery is fully charged. A standard charger will overcharge a battery if connected continually. The overcharging causes the liquid to evaporate and eventually will overheat the battery.

Smart Chargers are available at any auto parts store. I found them in a price range from the one in the photo at \$20.00 on sale to \$40.00.

It could be smart but not practical to install a maintenance charger on the vehicles that will sit. The option would be to connect a charger to each battery bank once a month to insure the charge is maintained.

Try to never use the booster charger. As the next season approaches, plan to connect a slow charger to the machine a couple days ahead of needing it. This slow charging process is best for the battery.

Installing a high current disconnect at the battery is a good option to insure complete disconnect. WayTek is a good option for ordering on the internet or check your auto parts supplier.



Any level of corrosion and loose of bad connectors will cause a host of problems. Not only starting the vehicle but the ability to power all the electronics on board is affected.

You can buy “Terminal Cleaner” that neutralizes the acids effects on the terminals and “Protectors” that keep corrosion from occurring.



Cleaning brushes can be helpful along with new terminals if needed.

The available “Connector Pads” neutralize any acid build-ups under the terminals.



At the high end of the battery price structure at AutoZone is the Optima Battery at about \$250.00. This is a different kind of battery. It's a Sealed Lead Acid battery or what I've always called a Jell-Cell. Rather than liquid acid environment, these have a more solid jell. This construction allows for a stable structure for the plates making them extremely good in shock and vibration but allows for great performance in high current starting conditions and also great performance powering electronics when not being charged. They can be mounted in any position. The only down side is cost.

For marine applications two batteries are recommended. The first is used to start the vehicle and another to power the lights, stereo and other accessories. A standard lead acid battery is used for starting and the electronics battery is a jell cell for lower current needs for long periods of time. Both can charge from the same alternator using a switch or diode installed to isolate the two. My Tech Notes on Diodes might be helpful.

I hope you've enjoyed this issue of Tech Notes! Remember Tech Notes is for the field guys. Please pass it on.

Contact me at [john@agtester.com](mailto:john@agtester.com). Send me your comments and suggestions. I'll look forward to hearing from you.

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John Dignan

[john@atagtester.com](mailto:john@atagtester.com)

419-203-3490