

**Table 8-4.**  
*Effect of Specific Gravity on Battery Freezing Temperature*

Specific Gravity Corrected to 80°F	Battery Freeze Point (°F)
1.289	-90
1.250	-62
1.200	-16
1.150	5
1.100	19

initial filling of electrolyte without further charging. However, it is important that they be given an initial charge to ensure their airworthiness before installation in the aircraft. The reason that they should be charged on a battery charger before being installed in the aircraft is that the alternator will charge the battery at a very high rate. Charging from so low a state of charge at such a high rate leads to battery overheating and potential buckling of cell plates. Another significant concern when installing a new battery is the mixing of the electrolyte.

I remember well a cute trick I played on my high school chemistry lab partner. I threw a vial of water into a beaker of acid—lots of fun for everyone except the girl downstream and her new angora sweater. She received both a second-degree burn and a sweater modified by Lombardo, and I received an “F” in the course for that and other various and sundry reasons. Moral of the story: Always pour acid into water, not water into acid! And remember, it really is sulfuric acid. If you spill a little on the airplane you will discover that it literally eats through aluminum at an alarming rate. If that doesn’t bother you, consider that it will also cause severe skin burns and blindness, and inhaling the fumes may cause you to permanently lose your sense of smell and taste.

If acid comes in contact with your skin, immediately wash the affected area with baking soda to neutralize it. Needless to say, sulfuric acid is very powerful, so much so that the simple act of mixing it with water into electrolyte creates heat. Always give the mixture time to cool off before actually pouring it into the battery cells to prevent potential plate damage from overheating.

As a battery charges and discharges over time, the active material from the plates wears off and slowly collects at the bottom of the battery. Like people, batteries get old too and at some point the plates will no longer have enough active material left to produce adequate capacity. When you begin to find that the battery just doesn’t hold a charge like it used to, then it is probably time to trade it in for a new one. Due to the tendency for active material to wear off and collect at the bottom, it is important never to attempt to remove the electrolyte by turning the battery upside down and letting it pour out. The sediment will then run over the cell plates, creating a strong potential for the plates to short out. If for any reason you need to remove the electrolyte, it should be drawn out with a syringe-type instrument or even a hydrometer.