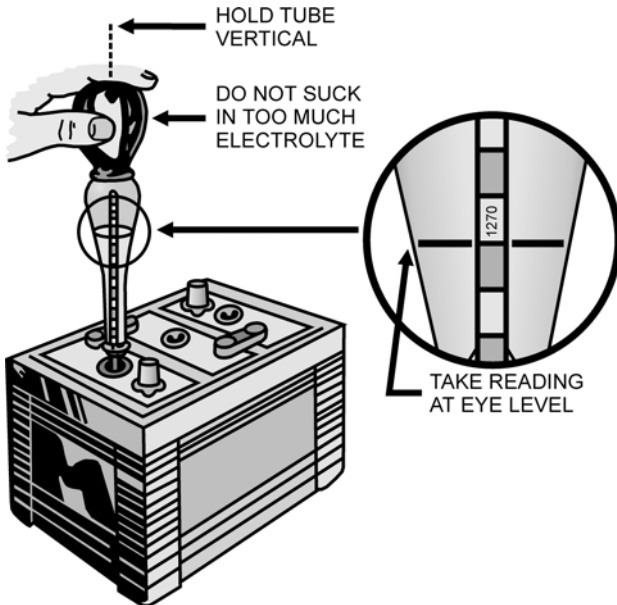


Care of Battery

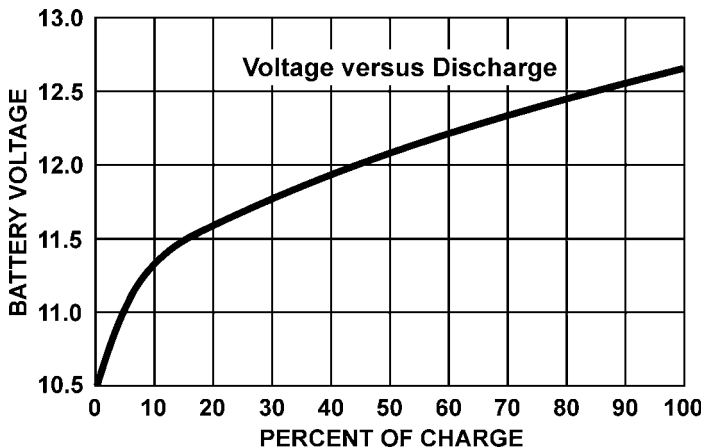
1. Visual inspection: Check electrolyte level at least once a month. If the batteries are fully charged and still charging, water loss may increase. It is advisable that a suitable charging regulator be installed to prevent overcharging of the battery. Overcharging is indicated if the battery is bubbling vigorously.
2. Hydrometer Test: Check the electrolyte level, to ensure that it is above the plates in all cells.

If it is below the plates, the test cannot be carried out until water is added and the battery charged to mix the water and residual acid in the battery. It is important to ensure that the plates do not remain exposed to air and allowed to dry and oxidise (see notes on page 37).

The state of charge of each cell can be measured with a hydrometer to determine the specific gravity of the electrolyte (specific gravity is its weight compared to water).



Testing Specific Gravity of a Battery

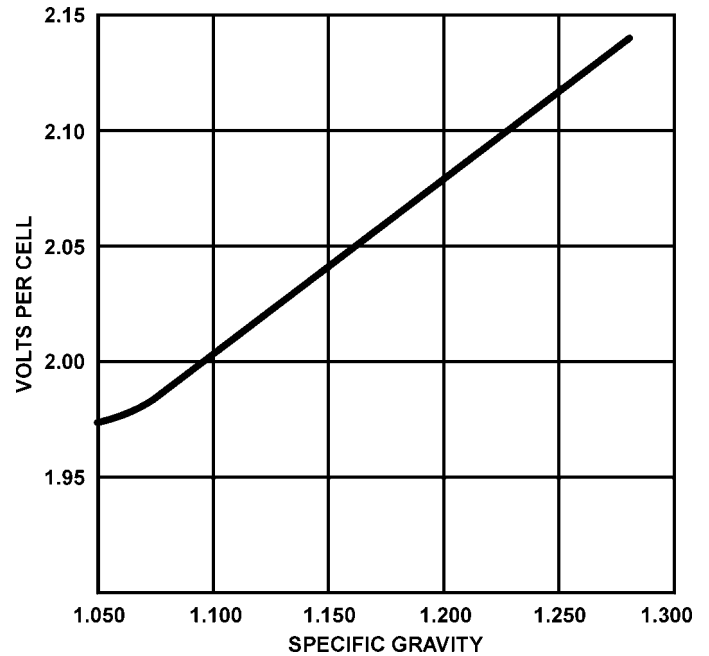


Using Hydrometer

Draw the acid into the hydrometer, so that the float is lifted free and not touching the top or the bottom. The barrel must be held vertically and the eye level with the surface of the liquid. Disregard the curvature of the liquid against the glass.

Cell temperature corrections should be applied if accurate readings are required. 0.004 points should be added or subtracted for each 5°C +/- variation from 25°C.

3. Voltage Test: Voltage readings should be taken whilst the batteries are neither charging nor discharging (nothing connected and turned on). Immediately after either charging or discharging the battery voltage may not have stabilised. The voltage will settle down in about 30 minutes after charge or discharge are discontinued.



| State of Charge (Approximate) | Apex | | Suncycle | | PVStor | |
|----------------------------------|-------|-------|----------|-------|--------|--------|
| | SG* | OCV † | SG * | OCV † | SG * | OCV † |
| 100% | 1.277 | 2.12 | 1.24 | 2.086 | 1.225 | 2.095 |
| 90% | 1.258 | 2.1 | 1.23 | 2.077 | 1.216 | 2.0775 |
| 80% | 1.238 | 2.08 | 1.22 | 2.067 | 1.207 | 2.06 |
| 75% | 1.227 | 2.07 | 1.215 | 2.062 | 1.203 | 2.0513 |
| 70% | 1.217 | 2.06 | 1.21 | 2.058 | 1.198 | 2.0425 |
| 60% | 1.195 | 2.04 | 1.2 | 2.048 | 1.189 | 2.025 |
| 50% | 1.172 | 2.02 | 1.19 | 2.04 | 1.179 | 2.0075 |
| 40% | 1.148 | 2 | 1.18 | 2.031 | 1.171 | 1.99 |
| 30% | 1.124 | 1.98 | 1.17 | 2.022 | 1.163 | 1.9725 |
| 25% | 1.111 | 1.96 | 1.165 | 2.018 | 1.158 | 1.9638 |
| 20% | 1.098 | 1.95 | 1.16 | 2.013 | 1.153 | 1.955 |
| 10% | 1.073 | 1.93 | 1.15 | 2.005 | 1.145 | 1.9375 |
| 0% | 1.048 | 1.91 | 1.14 | 1.996 | 1.135 | 1.92 |

SG * — Specific Gravity @ 25°C

OCV † — Open Circuit Voltage per 2 Volt Cell

Specific Gravity

The hydrometer measures the Specific Gravity (SG) of a battery. You will find that the electrolyte in the hydrometer tends to curve up at the edges against the glass. This curvature is referred to as a meniscus. The SG reading should be taken from the bottom of the meniscus.

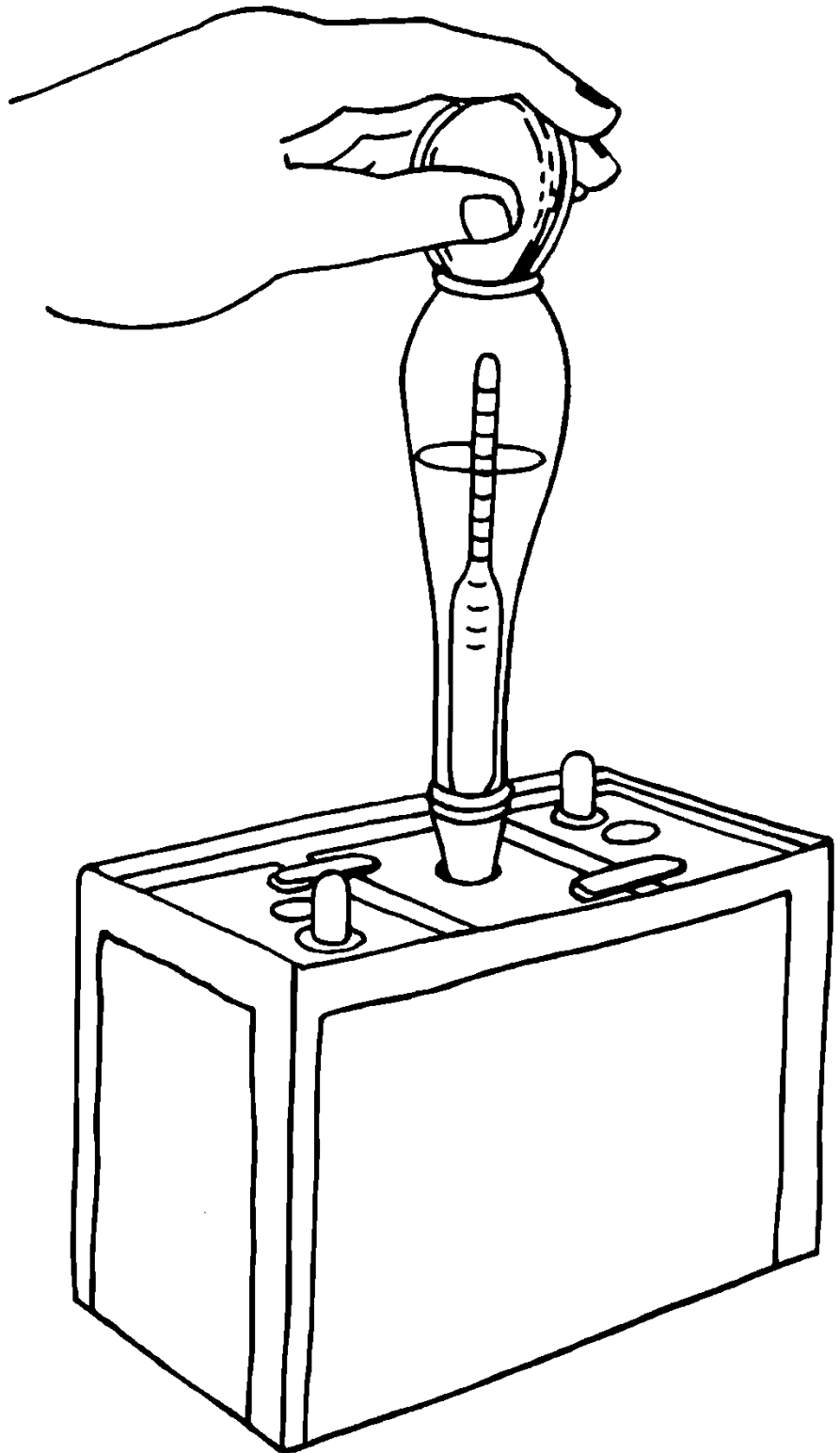
The SG is a measure of the concentration of the acid in a battery. Due to chemical action caused by charging and discharging, the proportion of sulphuric acid (SG = 1.8) to water (SG = 1) in the electrolyte and therefore, the SG of the electrolyte, gradually increases during charge and decreases during discharge.

The complete working range of SG lies between the limits of 1.1 and 1.3. If below 1.1, damage may be caused by the plates becoming hydrated, while if above 1.3 the plates and grids are liable to be corroded.

The SG of the electrolyte of a fully charged battery is between 1.215 and 1.28, depending on the battery type. When the SG falls to about 1.175 the battery is considered to be discharged and needs charging.

The SG is often multiplied by 1000 and the hydrometer scale marked accordingly. SG readings should be referred to a temperature of 25°C. A temperature that is significantly at variance with this temperature will cause a change of density of the electrolyte and needs to be taken into account when the SG is measured. Refer to the SG versus temperature graph (page 35). A significantly lower temperature will also cause a sluggishness of the battery.

Owing to the time required for the diffusion of the electrolyte, the change in SG lags behind the charge or discharge by an amount which depends on the characteristics and dimensions of individual cells and the rate of charge or discharge. Consequently, the SG will continue to rise for a short period after the charge has been terminated and similarly may continue to fall after a discharge has been terminated, although, if the end of the discharge is at a low rate the lag may not be noticeable.



Only add distilled water to the electrolyte. Do not add acid, unless under the instruction and supervision of a Rainbow Power Company Battery Technician. Do not add water with impurities as these impurities will be accumulative over time and will cause problems. Do not take a SG reading just after topping up with water.
