Battery Terms Explained

1. **Active Material** - In the positive plates, the active material is lead dioxide. In the negative, it's metallic sponge lead. When a circuit is created, these materials react with sulfuric acid during charging and discharging.

2. **Ampere (Amp)** - A unit of measurement for the electron flow or current through a circuit.

3. **Ampere-Hour (Amp. Hr., AH)** - A unit of measure for a battery's electrical storage capacity, calculated by multiplying the current in amperes by the time in hours. (Example: A battery which delivers 5 amps for 20 hours provides 5 amps x 20 hours = 100 AH of capacity.)

4. **Capacity Rating** - The time in minutes that a new, fully-charged battery will deliver 25 amperes or 75 amperes at 80°F and maintain a terminal voltage equal to or greater than 1.75 volts per cell.

5. **Cell** - The basic current-producing unit in a battery. It consists of a set of positive plates, negative plates, electrolyte, separators and casing. A cell's nominal voltage is 2 volts. (Example: A 12-volt battery has 6 cells.)

6. **Circuit** - The path followed by a flow of electrons. A closed, or short, circuit is a complete path. An open circuit has a broken path.

7. **Cycle** - One discharge of a battery plus one recharge.

8. **Depth of Discharge (DOD)** - The percentage of capacity actually removed from a battery compared to the total rated capacity.

9. **Electrolyte** - In a deep cycle battery, it is a dilute solution of sulfuric acid and water.

10. **Hydrometer** - A tool used to measure the specific gravity of the electrolyte solution.

11. **Equalization** - An overcharge performed on flooded lead-acid batteries after they have been fully charged. This maintenance step helps eliminate stratification and sulfation.

If any specific gravity reading still registers lower than the factory specification, one or more of these conditions may exist:
- The battery is old and nearing end of life.
- The battery was left discharged too long.
- Electrolyte was lost due to spillage.
- A weak or bad cell is developing.
- The battery was over-watered prior to testing.

Batteries in conditions 1-4 should be taken to a specialist for further evaluation or retired from service.

**Open-Circuit Voltage Testing**

For accurate voltage readings, batteries must remain idle (no charging, no discharging) for at least 6 hours, and preferably 24 hours.

1. Disconnect all loads from the batteries.
2. Measure the voltage with a DC voltmeter.
3. Check the state of charge with the table below.
4. Charge the battery if it registers 0-70% charged.

If battery registers below table values, these conditions may exist:
- The battery was left discharged too long.
- The battery has a bad cell.

Batteries in these conditions should be taken to a specialist for further evaluation, or retired from service.

<table>
<thead>
<tr>
<th>% STATE OF CHARGE</th>
<th>SPECIFIC GRAVITY CORRECTED TO 80°F</th>
<th>OPEN-CIRCUIT VOLTAGE</th>
<th>6 VOLT</th>
<th>8 VOLT</th>
<th>12 VOLT</th>
</tr>
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<tbody>
<tr>
<td>100</td>
<td>1.277</td>
<td>6.37</td>
<td>6.49</td>
<td>12.73</td>
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<td>6.41</td>
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<td>1.195</td>
<td>6.12</td>
<td>6.16</td>
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<tr>
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<td>6.07</td>
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<td>5.83</td>
<td>5.77</td>
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<tr>
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<td>1.073</td>
<td>5.75</td>
<td>5.67</td>
<td>11.51</td>
<td></td>
</tr>
</tbody>
</table>

*State of charge as related to specific gravity and open-circuit voltage*

**Proper Torque Values for Connection Hardware**

**Flooded**
- Automotive: 50-70 in-lbs
- Side: 70-90 in-lbs
- Wingnut: 95-105 in-lbs
- LPT: 95-105 in-lbs
- LT: 100-120 in-lbs

**Gel**
- Button: 90-110 in-lbs
- LT: 100-120 in-lbs

**Specific Gravity Testing**

*(Flooded batteries only)*

1. Do not add water prior to testing.
2. Fill and drain the hydrometer 2-4 times before drawing a sample from the battery.
3. Have enough sample electrolyte in the hydrometer to completely support the float.
4. Take a reading, record it and return the electrolyte to the cell.
5. Check all cells in the battery, repeating the steps above.
6. Replace vent caps and wipe off any electrolyte that might have been spilled.
7. Correct the readings to 80°F:
   - Add .004 to readings for every 10°F above 80°F.
   - Subtract .004 for every 10°F below 80°F.
8. Check the state of charge using the table on the next page.

The readings should be within the factory specification of 1.277 +/- .007. If any specific gravity reading registers low, follow these steps:
1. Check and record voltage level(s).
2. Put batteries on a complete charge.
3. Take specific gravity readings again.

If any specific gravity reading still registers low, follow these steps:
1. Check voltage level(s).
2. Perform equalization charge. (See Equalizing).
3. Take specific gravity readings again.