Note: This information applies ONLY to 12 volt single lead acid batteries of the types listed.

WARNING: Data is not necessarily valid for conditions where multiple 12 volt batteries are connected in strings (series or parallel)

See notes below the data table for battery strings.

Recommend boost at or before this SOC before battery use.

Lead Acid Battery Types	Bulk Charging (Constant Current) 12 volt Battery	Absorption Charging (Constant Voltage) 12 volt Battery	Float Charging (Constant Voltage) 12 volt Battery	Trickle Charging (charge maintenance during extended storage)	Temperature Compensation	Open Circuit Voltage (OCV) @ 20% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 50% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 60% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 70% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 90% State of Charge (SOC)	Special notes	Other Guidelines
Standard Flooded/Wet Automotive SLI (Calcium) *Exide Select* *Exide Classic* *Exide Commercial* *Exide Cutting Edge* *Exide Marine Starting* *Flooded SuperCrank* *Flooded PowerSport*	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 14.8V (example; For C:20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 14.8V - 15.0V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C:20=100Ahr, the low current shut off is 1%x 100 or 1A).	13.5v - 13.8	Charge voltage on point - 12.60v Charge voltage off point - 13.5v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25°C (68-77°F). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12 v battery) for every 10°C (18° F.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12v battery) for every 10°C (18° F.) **Example:** at 95°F and 14.2 volt set point Corrected Voltage = 14.2 - (((95-77)/18) x (0.38)) = 13.82 volts	Not recommended	12.44v	12.52v	12.60v	12.77	**Battery Temperature:** Batteries should be brought to a temperature of at least 60°F (15.5°C) for most efficient charging and below 85°F (30°C) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.70 volts at 13.8 volts) **Operating Temperature:** The recommend operating temperature range is 10°C - 30° (50°F -86°F) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 50°C (122°F).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50°F - 77°F (10°C - 25°C). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 12.52 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18°F (10°) above 77°F (25°C) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.
Flooded/Wet Extreme Cycling (Calcium) *Exide Extreme* *Exide Marine Dual Purpose*	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 14.8V (example; For C:20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 14.8V - 15.0V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C:20=100Ahr, the low current shut off is 1%x 100 or 1A).	13.5v - 13.8	Charge voltage on point - 12.60v Charge voltage off point - 13.5v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25°C (68-77°F). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12 v battery) for every 10°C (18° F.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12v battery) for every 10°C (18° F.) **Example:** at 95°F and 14.2 volt set point Corrected Voltage = 14.2 - (((95-77)/18) x (0.38)) = 13.82volts	Not recommended	12.44v	12.52v	12.60v	12.77	**Battery Temperature:** Batteries should be brought to a temperature of at least 60°F (15.5°C) for most efficient charging and below 85°F (30°C) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.70 volts at 13.8 volts) **Operating Temperature:** The recommend operating temperature range is 10°C - 30° (50°F -86°F) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 50°C (122°F).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50°F - 77°F (10°C - 25°C). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 12.52 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18°F (10°) above 77°F (25°C) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.
Flooded/Wet Deep Cycle & Marine (Antimony) *Exide Marine Deep Cycle* *Exide Special Heavy Duty and Floor Scrubber*	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 14.7V (example; For C:20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 14.7V - 14.9V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C:20=100Ahr, the low current shut off is 1%x 100 or 1A).	13.2v - 13.4v	Charge voltage on point - 12.60v Charge voltage off point - 13.2v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25°C (68-77°F). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12 v battery) for every 10°C (18° F.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.063 Volts Per Cell (0.38 Volts for a 12v battery) for every 10°C (18° F.) **Example:** at 95°F and 14.2 volt set point Corrected Voltage = 14.2 + (((95-77)/18) x (0.38)) = 14.58 volts	12.1v	12.44v	12.52v	12.60v	12.77	**Battery Temperature:** Batteries should be brought to a temperature of at least 60°F (15.5°C) for most efficient charging and below 85°F (30°C) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.70 volts at 13.8 volts) **Operating Temperature:** The recommend operating temperature range is 10°C - 30° (50°F -86°F) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 50°C (122°F).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50°F - 77°F (10°C - 25°C). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 12.52 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18°F (10°) above 77°F (25°C) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.
Gel cell *Exide Prevailer*	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 14.1V (example; For C:20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 14.1V - 14.4V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C:20=100Ahr, the low current shut off is 1%x 100 or 1A).	13.5v - 13.8v with current limited to 4 times I_{20}.	Charge voltage on point - 12.75v Charge voltage off point - 13.5v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25°C (68-77°F). For average operating temperatures below this range (colder than) the voltage set point should be compensated with an increase at a rate of 0.05 Volts Per Cell (0.3 Volts for 12v battery) for every 10°C (18° F.) For average operating temperatures above this range (warmer than) the voltage set point should be compensated with a decrease at a rate of 0.05 Volts Per Cell (0.3 Volts) for every 10°C (18° F.) **Example:** at 95°F and 14.2 volt set point Corrected Voltage = 14.2 - (((95-77)/18) x (0.3)) = 13.9 volts	12.0v	12.40 v	12.50v	12.60v	12.90v	**Battery Temperature:** Batteries should be brought to a temperature of at least 60°F (15.5°C) for most efficient charging and below 85°F (30°C) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.70 volts at 13.8 volts) **Operating Temperature:** The recommend operating temperature range is 10°C - 30° (50°F -86°F) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 45°C (113°F).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50°F - 77°F (10°C - 25°C). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 12.7 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18°F (10°) above 77°F (25°C) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.
Flat Plate and Spiral AGM *Exide Edge* *Exide Vortex* *Exide Roadforce* *Exide MegaCycle* *AGM SuperCrank* *AGM PowerSport*	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 14.1V (example; For C:20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 14.1V - 14.4V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C:20=100Ahr, the low current shut off is 1%x 100 or 1A).	13.6v - 13.8v with current limited to 4 times I_{20}.	Charge voltage on point - 12.75v Charge voltage off point - 13.6v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are based on a temperature of 77°F (25°C). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.018 volts / °F (0.032 volts/° C.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.018 volts / °F (0.03 volts/° C.) **Example:** at 65°F and 14.2 volt set point Corrected Voltage = 14.2 - ((77-65) x (0.018)) = 13.82 volts	12.0v	12.40v	12.50v	12.60v	12.90v	**Battery Temperature:** Batteries should be brought to a temperature of at least 60°F (15.5°C) for most efficient charging and below 85°F (30°C) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 1 Amp. Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: 0.70 volts for 13.8 float voltage) **Operating Temperature:** The recommend operating temperature range is 50°F -85°F (10°C - 30°C) for optimal operation. Lower (colder) temperatures will limit capacity output. Higher (warmer) temperatures will reduce life. Maximum operating temperature is 113°F (45°C)	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50°F - 77°F (10°C - 25°C). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 12.7 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18°F (10°) above 77°F (25°C) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.

Helpful explanations

1) Calcium and Antimony notations refer to metal alloy additives used in battery grids. These alloys have small effects on the charge voltages.
2) Bulk charging is the rapid and most aggressive re-charge method. It is typically only used in applications that need rapid recovery for deeply discharged batteries. Battery cooling may be required.
3) Absorption charge is an aggressive method where current is allowed to diminish as the battery naturally comes to full charge. It can be used for deeply or less deeply discharged batteries. Battery cooling may be required.
4) Float charge is a stage where the battery is charged at a lower voltage to slowly "top off" a slightly discharged battery.
5) Trickle charging is used to maintain charge during a long storage period. Charge voltage on/off points are very important to hold charge without damaging battery life.
6) State of Charge (SOC) is a highly variable number. Data should be taken as reflective of technology listed, but actual performance may be plus/minus 0.10 volts.
7) The reference to C_{20} in the table above means 20 hour capacity as measured in amp-hours (Ahr). Similarly, I_{20} refers to the current discharge rate for 20 hour capacity. For example, a C_{20} of 100 Ahr would have an I_{20} of 5 amps (5 amps times 20 hours = 100 Ahr)
8) To estimate C_{20} capacity for 12 volt batteries - if RC rating is 200 minutes or less, multiply RC minutes times 0.58 = C_{20} capacity. If RC rating is more than 200 minutes, multiply RC minutes times 0.50 = C20 capacity.
9) The term SLI refers to automotive batteries used for Starting, Lighting and Ignition (SLI)

For 24 volt systems that are comprised of two (2) 12 volt batteries connected in series that are charged with 24 volt chargers (with no parallel battery connections)

1) All charging voltages double (due to series connection) as listed in the above table.
2) All charging currents remain identical to 12 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 12 volt numbers as listed above (due to the series connection.)

For 48 volt systems that are comprised of four (4) 12 volt batteries connected in series that are charged with 48 volt chargers (with no parallel battery connections)

1) All charging voltages increase X 4 (due to series connection) as listed in the above table.
2) All charging currents remain identical to 12 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 12 volt numbers as listed above (due to the series connection.)

Note: This information applies ONLY to 8 volt single lead acid batteries of the types listed.

WARNING: Data is not necessarily valid for conditions where multiple 12 volt batteries are connected in strings (series or parallel)

See notes below the data table for battery strings.

Lead Acid Battery Types	Bulk Charging (Constant Current) 8 volt Battery	Absorption Charging (Constant Voltage) 8 volt Battery	Float Charging (Constant Voltage) 8 volt Battery	Trickle Charging (charge maintenance during extended storage)	Temperature Compensation	Open Circuit Voltage (OCV) @ 10% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 50% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 60% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 70% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 90% State of Charge (SOC)	Special notes	Other Guidelines
Flooded/Wet Deep Cycle (Antimony) ***Exide Golf Cart*** ***Exide Special Heavy Duty***	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 9.78V (example; For C20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 9.78V - 9.91V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C20=100Ahr, the low current shut off is 1%x 100 or 1A).	8.78v - 8.91v	Charge voltage on point - 8.25v Charge voltage off point - 8.78v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25ºC (68-77ºF). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.063 Volts Per Cell (0.25 Volts for a 8 v battery) for every 10ºC (18º F.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.063 Volts Per Cell (0.25 Volts for a 8v battery) for every 10ºC (18º F.) **Example:** at 95ºF and 9.4 volt set point Corrected Voltage = 9.4 - (((95-77)/18) x (0.25)) = 9.15 volts	7.65v	8.04v	8.16v	8.25v	8.45	**Battery Temperature:** Batteries should be brought to a temperature of at least 60ºF (15ºC) for most efficient charging and below 85ºF (30ºC) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.46 volts at 9.2 volts) **Operating Temperature:** The recommend operating temperature range is 10ºC - 30º (50ºF -86ºF) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 50ºC (122ºF).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50ºF - 77ºF (10ºC - 25ºC). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 8.16 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18ºF (10º) above 77ºF (25ºC) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.

Recommend boost at or before this SOC before batteryuse.

Helpful explanations

1) Calcium and Antimony notations refer to metal alloy additives used in battery grids. These alloys have small effects on the charge voltages.
2) Bulk charging is the rapid and most aggressive re-charge method. It is typically only used in applications that need rapid recovery for deeply discharged batteries. Battery cooling may be required.
3) Absorption charge is an aggressive method where current is allowed to diminish as the battery naturally comes to full charge. It can be used for deeply or less deeply discharged batteries. Battery cooling may be required.
4) Float charge is a stage where the battery is charged at a lower voltage to slowly "top off" a slightly discharged battery.
5) Trickle charging is used to maintain charge during a long storage period. Charge voltage on/off points are very important to hold charge without damaging battery life.
6) State of Charge (SOC) is a highly variable number. Data should be taken as reflective of technology listed, but actual performance may be plus/minus 0.10 volts.
7) The reference to C_{20} in the table above means 20 hour capacity as measured in amp-hours (Ahr). Similarly, I_{20} refers to the current discharge rate for 20 hour capacity. For example, a C_{20} of 100 Ahr would have an I_{20} of 5 amps (5 amps times 20 hours = 100 Ahr)
8) To estimate C_{20} capacity for 8 volt GC batteries - multiply RC minutes at 56 amps times 1.35 = C_{20} capacity. For example, RC minutes at 56 amps is rated at 110 minutes. The C_{20} estimate is 110 times 1.35 = 149 Ahr.

For 16 volt systems that are comprised of two (2) 8 volt batteries connected in series that are charged with 16 volt chargers (with no parallel battery connections)

1) All charging voltages double (due to series connection) as listed in the above table.
2) All charging currents remain identical to 8 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 8 volt numbers as listed above (due to the series connection.)

For 24 volt systems that are comprised of four (3) 8 volt batteries connected in series that are charged with 24 volt chargers (with no parallel battery connections)

1) All charging voltages increase X 3 (due to series connection) as listed in the above table.
2) All charging currents remain identical to 8 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 8 volt numbers as listed above (due to the series connection.)

For 8 volt battery strings using two batteries in parallel connection (positive to positive and negative to negative)

1) All charging voltages remain the same as listed in above table.
2) All charging currents double as listed above in order to charge in same amount of time as listed in above table.
3) All charging times double as listed in above table if current stays as listed in the above table..

Note: This information applies ONLY to 6 volt single lead acid batteries of the types listed.

WARNING: Data is not necessarily valid for conditions where multiple 6 volt batteries are connected in strings (series or parallel)

See notes below the data table for battery strings.

Recommend boost at or before this SOC before battery use.

Lead Acid Battery Types	Bulk Charging (Constant Current) 6 volt Battery	Absorption Charging (Constant Voltage) 6 volt Battery	Float Charging (Constant Voltage) 6 volt Battery	Trickle Charging (charge maintenance during extended storage)	Temperature Compensation	Open Circuit Voltage (OCV) @ 10% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 50% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 60% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 70% State of Charge (SOC)	Open Circuit Voltage (OCV) @ 90% State of Charge (SOC)	Special notes	Other Guidelines
Flooded/Wet Golf Cart, Deep Cycle & Marine (Antimony) ***Exide Golf Cart Exide Floor Scrubber***	Charge at a constant current rate of no more than 10 times I_{20} to a voltage of 7.35V (example; For C20=100Ahr, the max charge current is 10x5A or 50A).	Charge with 7.35V - 7.45V limit for 12 to 24 hrs or when current drops below 1% of the C20 rating (example; C20=100Ahr, the low current shut off is 1%x 100 or 1A).	6.6v - 6.7v	Charge voltage on point - 6.2v Charge voltage off point - 6.6v Limit current to 0.4 times I_{20}	**Charging Temperature Compensation:** All the listed charging voltages are appropriate for a temperature range of 15-25ºC (68-77ºF). For average operating temperatures below this range (colder than) the maximum voltage set point should be compensated with an increase at a rate of 0.063 Volts Per Cell (0.19 Volts for a 6 v battery) for every 10ºC (18° F.) For average operating temperatures above this range (warmer than) the maximum voltage set point should be compensated with a decrease at a rate of 0.063 Volts Per Cell (0.19 Volts for a 6v battery) for every 10ºC (18° F.) **Example:** at 95ºF and 7.1 volt set point Corrected Voltage = 7.1 - (((95-77)/18) x (0.19)) = 6.91 volts	5.75v	6.04v	6.13v	6.20v	6.33	**Battery Temperature:** Batteries should be brought to a temperature of at least 60ºF (15ºC) for most efficient charging and below 85ºF (30ºC) to limit over heating effects. **AC Ripple Charge Limitations:** Some DC chargers will have what is referred to as an AC ripple wave-form to the charging input. Excessive ripple can cause battery heating and gassing resulting in reduced life. Ripple current excursions during the float charging phase should not exceed 5 Amps for every 100 AH of nominal capacity (Example: 4 amps for 80 AH battery) Ripple voltage excursions during float should not exceed +/- 5% of the float voltage. (Example: +/- 0.35 volts at 6.9 volts) **Operating Temperature:** The recommend operating temperature range is 10ºC - 30° (50ºF -86ºF) for optimal operation. Lower temperatures will limit capacity output. Higher temperatures may reduce life. Maximum operating temperature is 50ºC (122ºF).	**Storage:** For open circuit storage it is recommended that the battery be stored indoors in a clean, dry location. Never store (or operate) in an airtight enclosure. Keep away from direct heat sources. Storage temperature should be between 50ºF - 77ºF (10ºC - 25ºC). Batteries should be disconnected from all potential load sources during storage. Batteries should be fully charged prior to storage. Batteries should be boost charged every 6 months or when the battery voltage reaches 6.13 volts. Storage at elevated temperatures will result in accelerated rates of self discharge. A general rule of thumb is that for every 18ºF (10°) above 77ºF (25ºC) the time before boost charging will be halved. Storage without proper charge can result in excessive sulfation and can be detrimental to battery performance and life.

Helpful explanations

1) Calcium and Antimony notations refer to metal alloy additives used in battery grids. These alloys have small effects on the charge voltages.
2) Bulk charging is the rapid and most aggressive re-charge method. It is typically only used in applications that need rapid recovery for deeply discharged batteries. Battery cooling may be required.
3) Absorption charge is an aggressive method where current is allowed to diminish as the battery naturally comes to full charge. It can be used for deeply or less deeply discharged batteries. Battery cooling may be required.
4) Float charge is a stage where the battery is charged at a lower voltage to slowly "top off" a slightly discharged battery.
5) Trickle charging is used to maintain charge during a long storage period. Charge voltage on/off points are very important to hold charge without damaging battery life.
6) State of Charge (SOC) is a highly variable number. Data should be taken as reflective of technology listed, but actual performance may be plus/minus 0.10 volts.
7) The reference to C_{20} in the table above means 20 hour capacity as measured in amp-hours (Ahr). Similarly, I_{20} refers to the current discharge rate for 20 hour capacity. For example, a C_{20} of 100 Ahr would have an I_{20} of 5 amps (5 amps times 20 hours = 100 Ahr)
8) To estimate C_{20} capacity for 6 volt GC batteries - multiply RC minutes at 75 amps times 1.68 = C_{20} capacity. For example, RC minutes at 75 amps is rated at 110 minutes. The C_{20} estimate is 110 times 1.68 = 185 Ahr.

For 12 volt systems that are comprised of two (2) 6 volt batteries connected in series that are charged with 12 volt chargers (with no parallel battery connections)

1) All charging voltages double (due to series connection) as listed in the above table.
2) All charging currents remain identical to 6 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 6 volt numbers as listed above (due to the series connection.)

For 24 volt systems that are comprised of four (4) 6 volt batteries connected in series that are charged with 24 volt chargers (with no parallel battery connections)

1) All charging voltages increase X 4 (due to series connection) as listed in the above table.
2) All charging currents remain identical to 6 volt numbers as listed above (due to the series connection.)
3) All charging times remain identical to 6 volt numbers as listed above (due to the series connection.)

For 6 volt battery strings using two batteries in parallel connection (positive to positive and negative to negative)

1) All charging voltages remain the same as listed in above table.
2) All charging currents double as listed above in order to charge in same amount of time as listed in above table.
3) All charging times double as listed in above table if current stays as listed in the above table..