INITIAL CHARGE

OPEN TANK LEAD-ACID STORAGE CELLS

INSTALLING

1. GENERAL

1.01 This section outlines the general engineering requirements for the initial charge of the Electric Storage Battery Company's open tank lead-acid storage batteries.

1.02 This section is reissued to include charging schedules for pasted plates which are now being furnished instead of manchester positives and box negatives. Changes are marked with arrows.

1.03 Only pasted plates are now available from the battery manufacturer for plate additions in G and H tanks but some of the manchester positives and box negatives may still be in the hands of the telephone companies. Unless otherwise specified, all recommendations herein apply to both types.

1.04 The required ampere-hours of initial charge depend on the type of negative plates being installed. The three types of negative plates are as follows:

(a) "Wet negatives" which have not been allowed to dry after the previous charge;

(b) "Charged and dry negatives" which have been quick dried by a new process with air excluded; and

(c) "Formed negatives" which have been allowed to dry normally in air.

1.05 Dry negatives may be assumed to be "formed negatives" unless shipping papers are marked "charged and dry" or "C&D."

1.06 Wet negatives particularly those which have not been washed, are seriously affected by exposure to the air. This applies not only to completely exposed negatives but also to any negative that has more than the top 1" of plate exposed. Exposure, therefore, should be for as short a time as possible and in no case to exceed 20 minutes.

1.07 Delay charging at least 2 hours after pouring the electrolyte or inserting the new plates to permit the electrolyte to soak into the plates and separators, and to allow it to cool down to 95F or lower. A period to exceed four days may elapse before the charge is started.

1.08 Correct any lowering of electrolyte level between pouring electrolyte and starting the charge by the addition of more electrolyte of nominal specific gravity just before starting the charge. During the charge, distilled water or water approved for storage batteries shall be added, if necessary, to keep the electrolyte level within specified limits.

1.09 Cells being modified and plates being reused shall be fully charged before starting dismantling or other work prior to an initial charge.

1.10 See A401.001 for nominal charging rates, maximum and minimum levels, ampere-hours rated capacity, electrolyte specific gravity and voltage requirements, method of reading hydrometers, method of correcting specific gravity readings for temperature, method of adjusting electrolyte, method of giving mixing charge, containers for handling electrolyte, approved water, precautions against explosions, spilled electrolyte, etc.

2. CHARGE

2.01 Except as discussed in 2.03 and 2.06, the charging schedule shall be in accordance with Table A or B below. Note that the total charge is made up of more than one period, each period being for a definite number of hours at a specified rate. Charging rates shall be based on the total number of positive plates, including old and new, and on the type of negative plates being added.

TABLE A

WET NEGATIVES OR CHARGED AND DRY NEGATIVES

Min. Chg. Hrs.	Amps. Per Old and New Positives: Pasted Plates H	Pasted Plates G	Box Negatives H	Box Negatives G
8	27	13.5	30	15
8	18	9	20	10
8	9	4.5	10	5

TABLE B

FORMED NEGATIVES

Increase in Size of Element	Continuous Charge: Min. Chg. Hrs.	Amps. Per Old and New Positives: Pasted Plates H	Pasted Plates G	Box Negatives H	Box Negatives G
15-35%	8	27	13.5	30	15
	16	13.5	6.75	15	7.5
	46	9	4.5	10	5
35-65%	8	27	13.5	30	15
	8	18	9	20	10
	16	13.5	6.75	15	7.5
	34	9	4.5	10	5
66-100%	8	31.5	15.75	35	17.5
	8	18	9	20	10
	16	13.5	6.75	15	7.5
	34	9	4.5	10	5
	Interrupted Charge				
15-34%	8	27	13.5	30	15
	8	13.5	6.75	15	7.5
	8	0	0	0	0
	8	13.5	6.75	15	7.5
	8	9	4.5	10	5
	8	0	0	0	0
	42	9	4.5	10	5
35-65%	8	27	13.5	30	15
	8	18	9	20	10
	8	0	0	0	0
	8	18	9	20	10
	8	13.5	6.75	15	7.5
	8	0	0	0	0
	8	13.5	6.75	15	7.5
	12	9	4.5	10	5
66-100%	8	31.5	15.75	35	17.5
	8	18	9	20	10
	8	0	0	0	0
	8	18	9	20	10
	8	13.5	6.75	15	7.5
	8	0	0	0	0
	8	13.5	6.75	15	7.5
	22	9	4.5	10	5

Note that the current per positive plate would be from a column under pasted plates if the plates being added were of the pasted type regardless of the type of the other plates.

2.02 If charger capacity is not sufficient to obtain the higher rates given in the tables, the total ampere-hours listed at the higher rates shall be applied at the highest rate practicable, followed by the remainder of the schedule at rates within the charger capacity.

Example: If ten new H pasted plates are being added to 31 old H plates, either pasted or manchester positives and box negatives, the increase is 32 per cent and the total number of positive plates is 20. From Table B the schedule is 8 hours at 540 amperes, that is 27 amperes per plate for 20 plates. This is 4320 ampere-hours. If charger capacity is 400 amperes, this 4320 ampere-hours would be given at 400 amperes for 10.8 hours which is 10 hours and 48 minutes. The remaining schedule of 16 hours at 270 amperes and 46 hours at 180 amperes would be given in accordance with the table.

2.03 After the charge per the table, continue charging at the last rate, if necessary, until there has been a period of 10 hours (11 hourly readings) during which:

(a) the voltage is not increasing, or

(b) hydrometer readings are not increasing. A hydrometer reading one point high (+0.001) during the period of stability or a difference of one point in adjacent readings taken by different men should be disregarded in determining end of the period of stability

2.04 The scheduled charge may be interrupted, if necessary, at any time after the first 8 hours of charge but the total time of such nonscheduled rest periods shall in no case exceed the number of hours of charge already applied to the battery. If interruption occurs during the period of stability, the sum of the time of stability before and after the interruption shall be 10 hours.

2.05 Electrolyte temperature shall not exceed 120F for more than 3 hours during the charge. This is 10 degrees higher than permitted in other battery work. To avoid higher temperature, the charge may be interrupted temporarily to permit some cooling of the electrolyte.

2.06 If the telephone company definitely authorizes that the charge be completed in the minimum time and if the charger capacity is ample, the charge may be made continuously at the nominal rate (150 per cent of nominal rate may be used for the first 2 hours), providing switchboard circuit voltage limits are not exceeded where the battery is providing office current, and providing maximum temperature is not exceeded. See 2.05. The total minimum ampere-hours of charge in this case shall exceed the continuous charge ampere-hours in the tables by 15 per cent. The charge shall be continued at same rate until battery voltage or specific gravity has been stable for 10 hours. See 2.03. After completion of this charge, all painted surfaces in the battery room shall be washed by the installer with a weak soda solution. If the finish has been appreciably attacked by the acid, it may be necessary for it to be refinished by the telephone company.

3. ADJUSTMENT OF ELECTROLYTE

3.01 When the charge has been completed and the electrolyte in each cell is at the correct maximum level, make any necessary adjustments of the electrolyte in accordance with A401.001.

4. RECORDS

4.01 Records may be kept on form E2003 or WECo form ID-1285.

4.02 Always record the time and date of starting and stopping a charge, changing the rate of charge, or of taking any readings to be recorded.

4.03 Record all changes made in electrolyte level. The amount of water or electrolyte added per cell may be in quarts or in change in level in eighths of an inch.

4.04 During Charge

(a) Record

(1) amperes into the battery.

(2) temperature of pilot cell electrolyte.

(3) corrected specific gravity of pilot cell electrolyte.

(4) voltage of battery or pilot cell.

(b) At the following intervals

(1) every 1/2 hour for the first 2 hours (five readings) of charge.

(2) before stopping charge or changing rate.

(3) hourly for last 10 hours of scheduled charge and for additional period of charge necessary to get 10 hours of stability. See 2.03.

4.05 Just before charge is stopped, record individual cell voltages. These readings may be repeated later if not satisfactory at this time.

4.06 The day after completion of charge, record temperature, hydrometer readings, and corrected specific gravity of each cell. These readings may be repeated later if not satisfactory at this time.

4.07 Miscellaneous: Make note of items of special interest such as time and cell number when water is added, cells not gasing properly, irregularities in operation of chargers, local conditions affecting temperature of cells, any cells which do not come within the authorized specific gravity range at the end of the charge, etc. Give reasons for irregularities, if known. The initial charge report should include the name of the telephone company, office, town, and state; the order number, if known; the number and type of plates added; the number of plates; and the size of tank to which the plates are added.

4.08 A copy of the initial charge report and the final adjustment of electrolyte report, if made, shall be filed in the records maintained by the telephone company during the life of the battery. A copy of the initial charge report shall be forwarded to the battery manufacturing company.

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