

CHARGING STORAGE BATTERIES
BOOST CHARGE AND MAINTENANCE TO TURNOVER

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1. GENERAL

1.1 Scope

1.11 This section describes in Paragraph 4 the care of the battery from the end of the initial charge to the time the measurements preceding turnover are made. It also includes the boost charge and its use.

1.12 Modern storage batteries have a greater life expectancy than older batteries. As a result, proper care and maintenance is of greater importance during the installation period. Impurities in older batteries masked many installation irregularities. With reduced impurities these same irregularities may noticeably shorten the life of new batteries. Since they are designed for full floated operation, new batteries should be put on full float basis as early as possible. Improper maintenance or no maintenance will cause failure of a battery to meet final turnover requirements and may consume a great deal of the installer's time in taking corrective steps.

1.13 When the power plant is turned over to the telephone company in advance of the rest of the telephone office and they are not able to place the batteries immediately on 24 hour float, they must maintain the batteries in accordance with Paragraph 4 of this section.

1.14 This section is to be used with the other sections in the 18 series.

2. TOOLS AND SUPPLIES

2.1 The required tools and supplies are listed in Section 18A.

3. ELECTROLYTE LEVEL

3.1 With cells warm as a result of floating or charging for two or three hours, add water as necessary to keep electrolyte near "maximum level." Adding

larger amounts at longer intervals is preferred to adding small amounts frequently. Avoid adding water shortly before taking specific gravity readings as this contributes to erroneous readings.

3.2 Record additions on ID-1285 under "Electrolyte Level, Correction" column. See Figure 1.

4. MAINTENANCE TO TURNOVER

4.1 Daytime Charging

4.11 Although continuous float operation is recommended immediately following the initial charge, there are conditions under which it is not feasible.

4.12 In a new office the battery must not be placed on continuous float or charge unattended until the alarm circuits are in operation and attended.

4.13 An acceptable alternative to continuous float is to charge all of each working day at 2.20 or 2.30 volts per cell, whichever is to be the "boost charge" voltage by the operating company.

4.14 When maintaining a battery by daytime charging, at nights and over week ends and holidays the battery must be on open circuit. This means no load and no alarm relays, no control circuits for rectifiers, generators or emergency cells can be permitted to drain the battery while it is not on charge. A voltmeter that can not be unfused is considered a negligible drain.

4.2 Continuous Float

4.21 As soon as the battery can be placed under continuous attendance either directly or by means of tested and attended alarm circuits, place it on continuous float. See Figure 1

4.22 A new string, when added to a working battery, will be floated by the operating company.

STORAGE BATTERY REPORT

THIS COPY FOR _____

18 - 18F

TOWN AND STATE Maryland Park, Md.	OFFICE #5 X Bar	JOB ORDER NO. 69394-M	K5 LIST 15544 508	MEASURED ARBITRARY END LENGTH ☒ ☐	PILOT CELL NO. 16	DATE CELLS SHIPPED 5-17-58	NO. OF STRINGS CHARGED IN PARALLEL 1	SHEET 1	OF SHEETS 1
STREET ADDRESS 716 Pleasant Street	TELEPHONE COMPANY C & P of Maryland	SUPPLIERS ORDER NO. WE-13016-A	SUPPLIER C&D ☐ EXD ☒ GLD ☐	VOLTAGE REGULATION MAN ☐ AUTO ☒	CONNECTED TO WORKING EQUIP. YES ☐ NO ☒	DATE CHARGE STARTED 9-3, 58	BATTERY DESIG. 48 Volt "B"		

INDIVIDUAL CELL MEASUREMENTS											PILOT CELL MEASUREMENTS													
CELL NO. 17A	ELEC. LEVEL 17A (NOTES ON BACK)	INITIAL CHARGE 18B OR 18C				FLOAT AT TURNOVER					INITIAL CHARGE 18B OR 18C					MAINTENANCE CHARGE 18F								
		DATE 9-5-58				DATE 10-27-58					MEASURED END OR ARBITRARY LENGTH					FROM INITIAL CHARGE TO TURNOVER								
		AS REC.	CORR.	VOLTS	IN EXCESS OF 2.00	TEMP.	VOLTS	IN EXCESS OF 2.00	TEMP.	GRAVITY	IN EXCESS OF 1.000	DATE	HOUR	AMPS	VOLTS	TEMP.	GRAVITY	IN EXCESS OF 1.000	MONTH	DAY	HOUR OR NUMBER OF HOURS	GRAVITY	VOLTS	TEMP.
				MEAS.	CORR.	°F	MEAS.	CORR.	°F	MEAS.	CORR.				IN EXCESS OF 2.00	°F	IN EXCESS OF 1.000				IN EXCESS OF 1.000	IN EXCESS OF 2.00	°F	
			1/4 INCHES X PINTS																					
1	L	W02	50	50	84	19	19	80	207	208	9-3	9A	140		77	197	9	5	5	214	20	86		
2	L	W07	50	50	84	18	18	80	210	211		10	80	50	81	199	9	12	43.5	209	20	78		
3	ML	W01	50	50	85	17	17	80	212	213		11	65	50	84	203	9	19	43.5	210	20	78		
4	L	W04	50	50	85	18	18	80	216	217		12N	55	50	87	203	9	26	43.5	209	20	80		
5	L	W02	50	50	85	18	18	80	212	213		1P	48	50	89	205	10	1	20	209	20	76		
6	L	W02	50	50	85	17	17	81	210	211		2	42	50	91	208	10	3	54	209	17	79		
7	L	W01	55	55	85	18	18	80	212	213		3	38	50	91	207	10	10	168	209	17	80		
8	L	W04	53	53	85	16	16	80	208	209		4	35	50	91	208	10	17	168	209	17	79		
9	M2		53	53	85	18	18	80	209	210		4	Charge Interrupted					10	21	88.5	209	17	81	
10	L	W02	51	51	85	17	17	80	209	210	9-4	8A	140		79	217			Boost Charge Started					
11	L	W04	52	52	85	17	17	80	209	210		8:30	30	50	82	216	10	21	9:00A	-	22	-		
12	L	W07	47	48	88	14	14	82	206	208		9:30	22	50	85	216								
13	L	W01	50	51	88	17	17	82	207	209		10:30	14	50	87	216			Boost Charge Complete				144	Hours
14	L	W01	50	51	88	16	16	82	206	208		11:30	9	50	88	215	10	27	9:00A	-	22	-		
15	L	W03	51	52	88	15	15	82	206	208		12:30P	8	50	89	216	10	27	9:00A	210	17	81		
16	L	W02	50	51	87	17	17	81	209	210		1:30	8	50	89	216	10	27	3:00P	210	17	81		
17	L	W07	47	48	87	15	15	82	207	209		2:30	8	50	89	216								
18	L	W01	51	52	87	20	20	82	212	214		3:30	8	50	88	216								
19	L	W07	49	50	88	16	16	82	213	215		4:30	8	50	88	216								
20	L	W07	50	51	88	17	17	81	214	215		4:30	Charge Interrupted											
21	L		50	51	88	17	17	81	208	209	9-5	8A	140		80	218								
22	L	W06	50	50	86	18	18	81	208	209		8:30	8	50	83	215								
23	L	W02	49	49	86	17	17	81	207	208		9:30	8	50	85	202								
												10:30	8	50	87	211								
EM 1	L	W06	52	52	86	17	17	82	209	211	Charge Complete 6 Hours Stable													
EM 2	ML	W01	52	52	86	17	17	82	210	212	* Cell 13 returned to mfg. due to excessive spillage. Replacement received 6-12 on supplier's order WE-13023-A. Emergency cells charged in series with regular string.													
EM 3	L	W01	54	54	85	17	17	81	211	212														
EM 4	L	W05	51	51	85	16	16	82	208	210														

18B PAR. 11.1, 18C PAR. 10.1, PAR. 6
BOOST CHARGE REQUIRED AS TIME BETWEEN
INITIAL CHARGE AND TURNOVER WILL
EXCEED 6 WEEKS

PAR. 5.12 & 5.21 10:30A ALARMS CON-
NECTED AND TESTED. PLANT PUT ON
CONTINUOUS FLOAT

PAR. 5.13 & 5.31 CHARGE STARTED AT 11:45A

REMARKS:

DATE OF TURNOVER **10-27** 19 **58**

MEASUREMENTS BY

SECTION 18D PAR. 3.4

AVERAGE **.510**

AVERAGE **.170**

GRAVITY READINGS

SECTION 18B PAR. 12.51, 12.52
SECTION 18C PAR. 11.51, 11.52

(RP-18359-M)

SECTION 17A PAR. 5.5
2 PINTS ADDED WHEN
CELLS ARRIVED ON JOB
TO COVER PLATES

SECTION 18A PAR. 14.5
ADDED 3 ADDITIONAL PINTS
TO BRING TO MINIMUM
LEVEL

SECTION 18C PAR. 7.71 OR
SECTION 18B PAR. 6.35
ADDED 1 PINT TO BRING
TO MAXIMUM LEVEL

PAR. 4.1
ADDED 1 PINT AFTER
BOOST CHARGE & FINAL
VOLTAGE & SPECIFIC
GRAVITY READINGS

FIG. 1 TYPICAL COMPLETED STORAGE BATTERY REPORT WITH MAINTENANCE PERIOD, BOOST CHARGE, AND FINAL VOLTAGE AND GRAVITY READINGS (PARS. 3.2, 4.21, 4.31, 5.5)

4.23 On a new power plant float at a voltage equal to 2.17 volts per cell unless the design of the power plant dictates otherwise.

EXAMPLE: On a 23 cell string float at 49.91 volts unless power plant design requirements specifically dictates otherwise.

4.24 If the operating company requests 24 hour float before the alarms are connected they shall arrange for coverage by an attendant.

4.3 ID-1285

4.31 On ID-1285 under "Maintenance Charge" record weekly; the month, day, number of hours of float or charge per week, decimal portion of pilot cell specific gravity (corrected), pilot cell temperature, decimal portion of pilot cell volts or in case of a 250 volt battery, the decimal portion of average cell volts. See Figure 1.

4.4 Emergency Cells

4.41 At the completion of the initial charge and when the regular string is placed on charge or float, the emergency cells shall be placed on continuous float using the associated trickle charger. Since these cells are rarely subjected to office load before turnover, a record of maintenance need not be kept.

5. BOOST CHARGE

5.1 The boost charge is used at the following times:

5.11 When extending the period when the initial charge should have been applied.

5.12 When the time from the completion of the initial charge to turnover exceeds six weeks.

5.2 When a boost charge is required, start the charge and raise battery voltage to boost value at which it will be maintained. Charge for the number of hours indicated in Table A.

EXAMPLE: At 2.20 volts per cell, the length of charge would be 176 to 216 hours which is a little over one week of continuous charge. At 2.30 volts per cell, the time is 39.6 to 49.2 hours.

5.3 With electrolyte temperature above 95F the minimum length of boost charge is preferable, while at temperatures below 65F the maximum is preferable. For in-between temperatures either maximum or minimum length of charge may be used. See Table A. Charges at temperature below 50F shall be avoided.

TABLE A

VOLTAGE VERSUS HOURS OF BOOST CHARGE
(PARS. 5.2, 5.3)

VOLTS PER CELL	HOURS	
	MAX.	MIN.
2.50	2.7	2.1
2.49	3.3	2.4
2.48	3.6	2.7
2.47	4.2	3.3
2.46	4.8	3.6
2.45	5.7	4.2
2.44	6.6	5.1
2.43	7.5	5.7
2.42	8.7	6.6
2.41	10.2	7.8
2.40	11.7	9.0
2.39	13.5	10.5
2.38	15.6	12.0
2.37	18.0	14.1
2.36	20.7	16.5
2.35	24.0	19.2
2.34	27.6	22.2
2.33	32.1	25.8
2.32	37.2	29.7
2.31	43.2	34.5
2.30	49.2	39.6
2.29	57.5	46.5
2.28	67.2	54.0
2.27	77.4	61.2
2.26	90.0	72.3
2.25	104.0	84.0
2.24	122.0	97.0
2.23	141.0	113.0
2.22	162.0	132.0
2.21	187.0	152.0
2.20	216.0	176.0
2.19	216.0	176.0
2.18	216.0	176.0

NOTE: Where the power plant or circuit voltage limits do not permit charging at 2.20 volts per cell, the boost charge shall be made at the highest voltage available between 2.18 volts and 2.20 volts per cell. In this instance, the length of charge time shall be the maximum as shown in Table A for 2.20 volts per cell. During this boost charging period, special attention must be given to insure that the maximum voltage is maintained and that the voltage does not drop below 2.18 volts per cell.

5.4 If the charge is interrupted, for a period not to exceed three days at a time, the battery should be brought back to the same voltages as before the interruption and the constant voltage periods before and after the interruption added together.

5.5 On ID-1285, record boost charge information under "Maintenance Charge" columns before, during or following the weekly maintenance readings as required. Indicate boost charge started. Show month, date, time and pilot cell or average cell voltage at the start and at the completion of the boost charge. If the charge is interrupted show stopping time and restarting time when voltage is back to the boost value. See Figure 1.

6. FINAL REQUIREMENTS

6.1 Since this section does not cover final readings before turnover refer back to the section under which the charge was given for float voltage requirements and specific gravity requirements. This same section covers the disposition of the Storage Battery Report ID-1285.

7. RE-EXAMINATION AND FINAL CLEANING

7.1 Before the battery is turned over to the operating company (after the Initial Charge and any Boost Charge required) it shall be carefully re-examined for re-appearance of electrolyte. The cells were cleaned thoroughly when they arrived on the job as covered in Section 17A.

7.11 Inspect for reappearance of electrolyte along cover-to-jar seal. This may appear as beads and would indicate a break in the seal.

7.12 Inspect for evidence of electrolyte creepage around the posts (e.g., blackening of the positive posts or other evidence of creepage.)

7.13 If either of the above items become evident they should be reported on a Route "G" JIM as described in Section 17A.

7.2 As a final measure before turning the battery over to the operating company and with the battery on float, (not charging) clean the cells and shelves to remove dust and any foreign matter with a dry cleaning cloth KS-14666 or equivalent.

→ Arrowed lines indicate new or changed information.

[Vertical line at side of paragraphs indicates requirements.

R. W. HILLEGAS

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Reason for Reissue:

To require re-examination for electrolyte and final cleaning.

Replaces Section 18F dated 4-19-62.