APPENDIX B

TYPICAL PERFORMANCE CHARACTERISTICS OF

NICKEL-CADMIUM POCKET PLATE CELLS

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TYPICAL PERFORMANCE CHARACTERISTICS OF NICKEL-CADMIUM POCKET PLATE CELLS

Data is summarized in this appendix of the discharge and charge characteristics of a typical vented, intermediate rate, pocket plate nickel-cadmium cell. High rate and low rate cells are also available from manufacturers and can be considered by the system designer. High rate cells will have higher voltages on high rate discharges like starter loads. Low rate cells will have superior energy density and longer life.

Data for hermetically sealed sintered nickel-cadmium cells has not been enclosed because of the higher cost of these cells; however, this data can be supplied by the battery manufacturer upon request.

APPENDIX B-1

TYPICAL PERFORMANCE CHARACTERISTICS OF NICKEL-CADMIUM POCKET PLATE CELLS

TABLE B-1-1

Discharge Voltage vs. Discharge Rate and Depth of Discharge Pocket Plate Nickel-Cadmium Cells, 25^0C

Discharge Capacity % of 5-h Rate	Cell Voltage at Specified Rate: 50-h Rate Volts	10-h Rate Volts	5-h Rate Volts	1-h Rate Volts
0	1.35	1.34	1.32	1.20
20	1.30	1.28	1.25	1.12
40	1.28	1.26	1.23	1.08
60	1.26	1.24	1.21	1.03
80	1.24	1.22	1.20	0.80
100	1.18	1.15	1.00	--

TABLE B-1-2

Charge Efficiency of Pocket Plate Nickel Cadmium Cells, 25^0C (31% KOH Electrolyte)

Discharge Output % of Rated 5-h Capacity	Recharge Required to Restore Output Capacity % of Rated 5-h Capacity (1)	Overcharge Required %
100	140	40
80	120	40
60	98	38
40	75	35
20	50	30
10	30	20

(1) Recharge time: 20 hours minimum.

TABLE B-1-3

Energy Output, Energy Pocket Plate Density vs. Discharge Rate, 25^{0}C Nickel Cadmium Cells (7.5 - 480 Ah)

Discharge Rate	Cell Capacity (Nominal) 5-h to 0.9V	Energy Output to 0.9V	Energy Density Unit Weight	Energy Density Unit Volume
h	Ah	Wh	Wh/lb.	Wh/in^3
500	7.5	11.2	6.2	0.31
50		11.0	6.1	0.30
10		9.6	5.3	0.26
5		8.9	4.9	0.24
1		6.3	3.5	0.17
500	85	129	14.7	0.64
50		125	14.2	0.63
10		110	12.5	0.55
5		103	11.7	0.52
1		72	8.2	0.36
500	300	450	20.6	1.20
50		440	20.2	1.17
10		385	17.7	1.03
5		360	16.5	0.96
1		250	11.5	0.67
500	480	710	20.8	1.25
50		690	20.2	1.21
10		605	17.7	1.07
5		565	16.5	0.99
1		395	11.5	0.70

Cell Nominal Capacity Ah	Weight Per Cell lb.	Volume Per Cell in^3
7.5	1.8	36.5
85	8.8	199
300	21.8	375
480	34.2	568

Note: Charged and maintained in accord with manufacturer's operating instructions.

TABLE B-1-4

Charged Stand Loss Rates
Pocket Plate Nickel Cadmium Cells

Charged Stand Time Months	Temperature ^{0}C	Capacity Retained %	Capacity Loss Rate %/day
2	22	87	0.22
4	22	82	0.15
6	22	80	0.11
12	22	78	0.06
2	49	62	0.63
4	49	40	0.50
6	49	24	0.42
8	49	10	0.38