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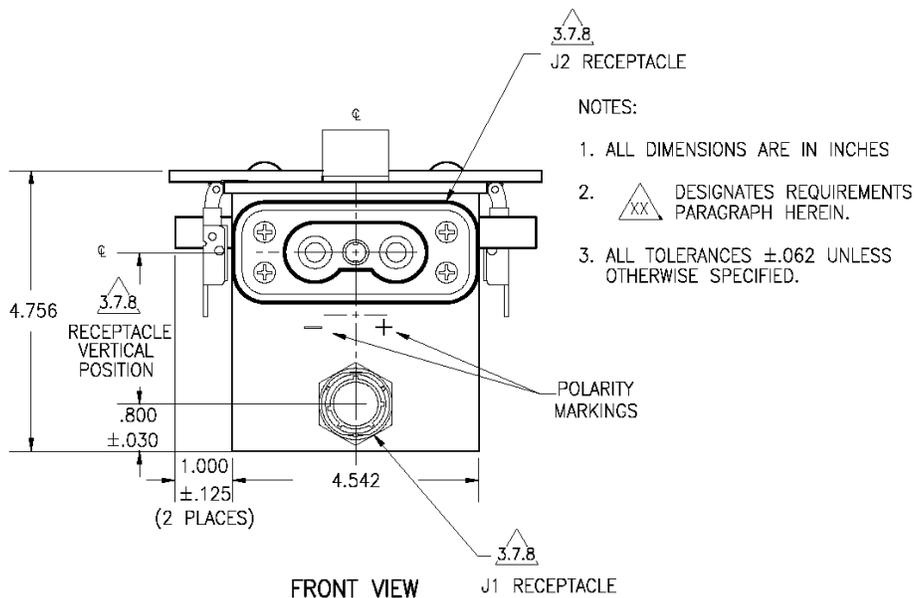
MIL-PRF-81757/14A(AS)
9 October 2003
SUPERSEDING
MIL-PRF-81757/14(AS)
w/AMENDMENT 1
1 March 1999

PERFORMANCE SPECIFICATION SHEET

BATTERY, STORAGE, AIRCRAFT, NICKEL-CADMIUM,
24-VOLT, 5.5-AMPERE-HOUR, LOW-MAINTENANCE, VENTED

This specification is approved for use by the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

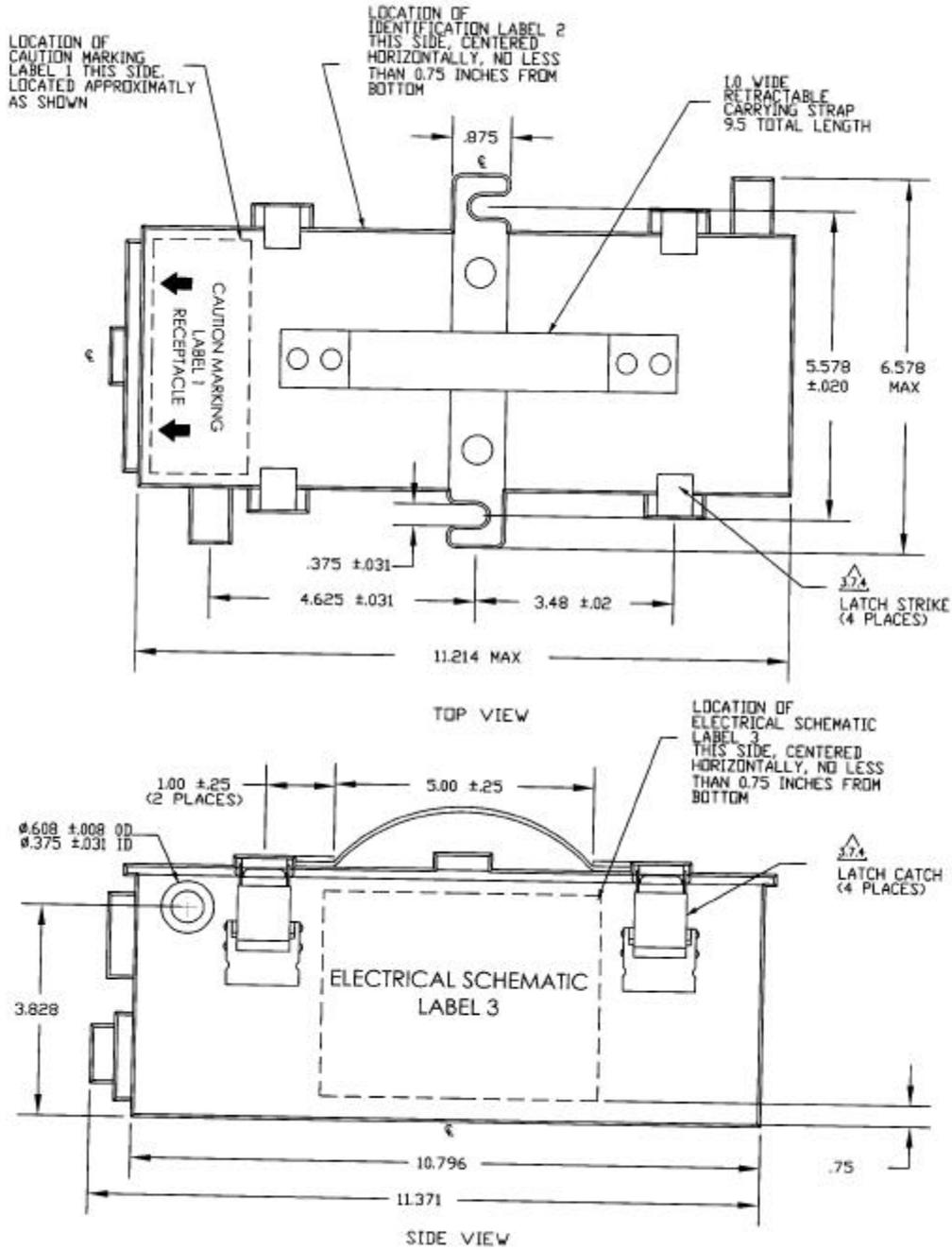
The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-81757.



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FIGURE 1. PIN M81757/14-1 dimensions.

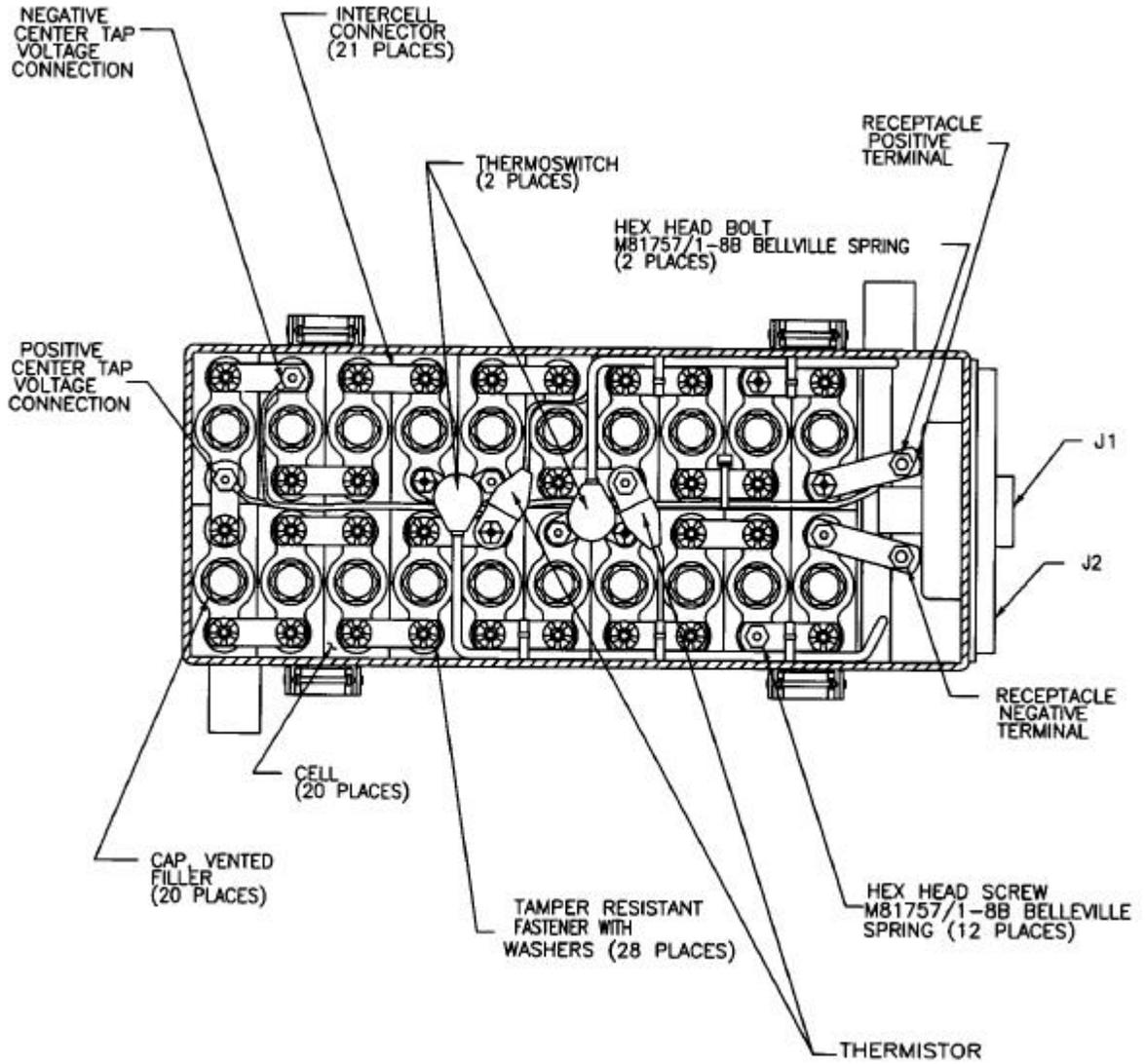
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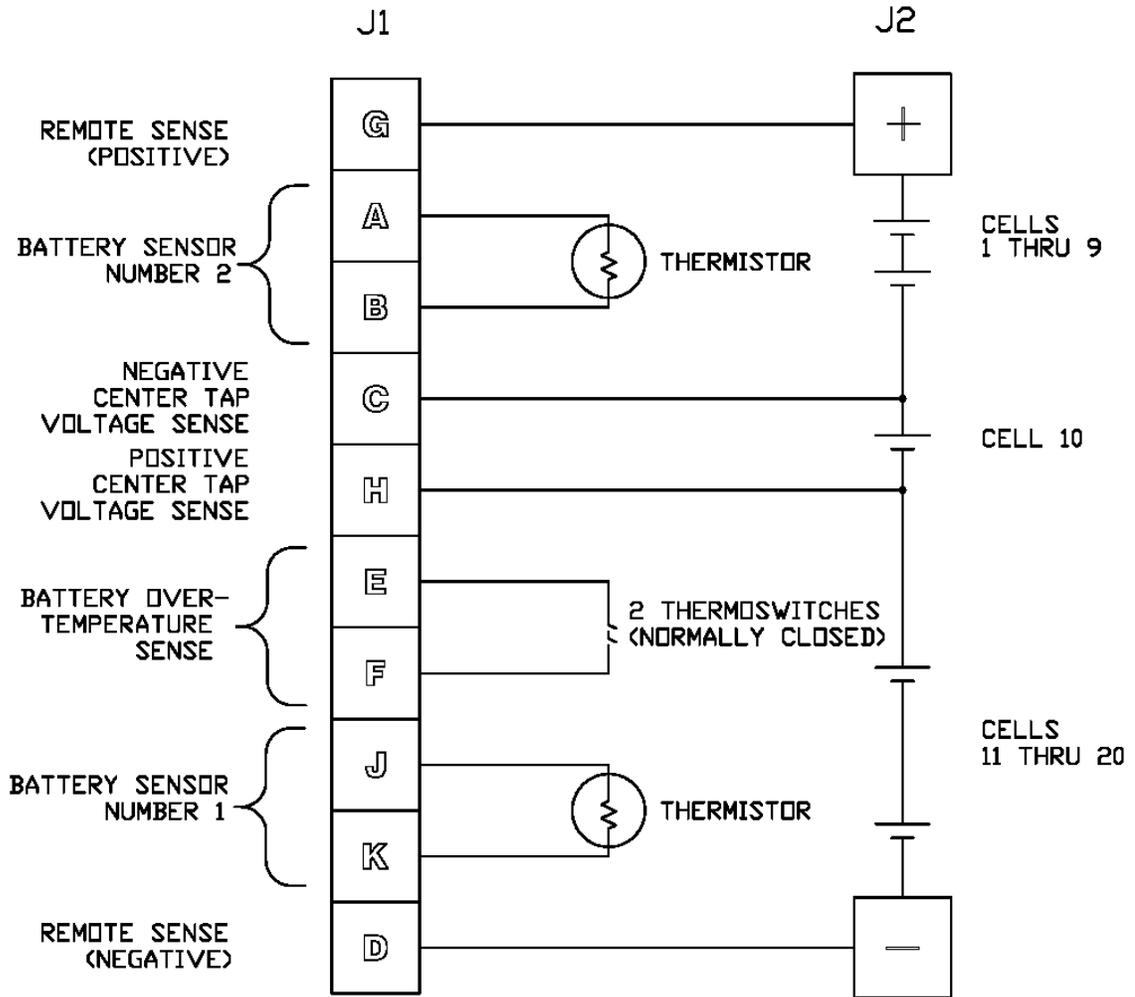
FIGURE 1. PIN M81757/14-1 dimensions - Continued.

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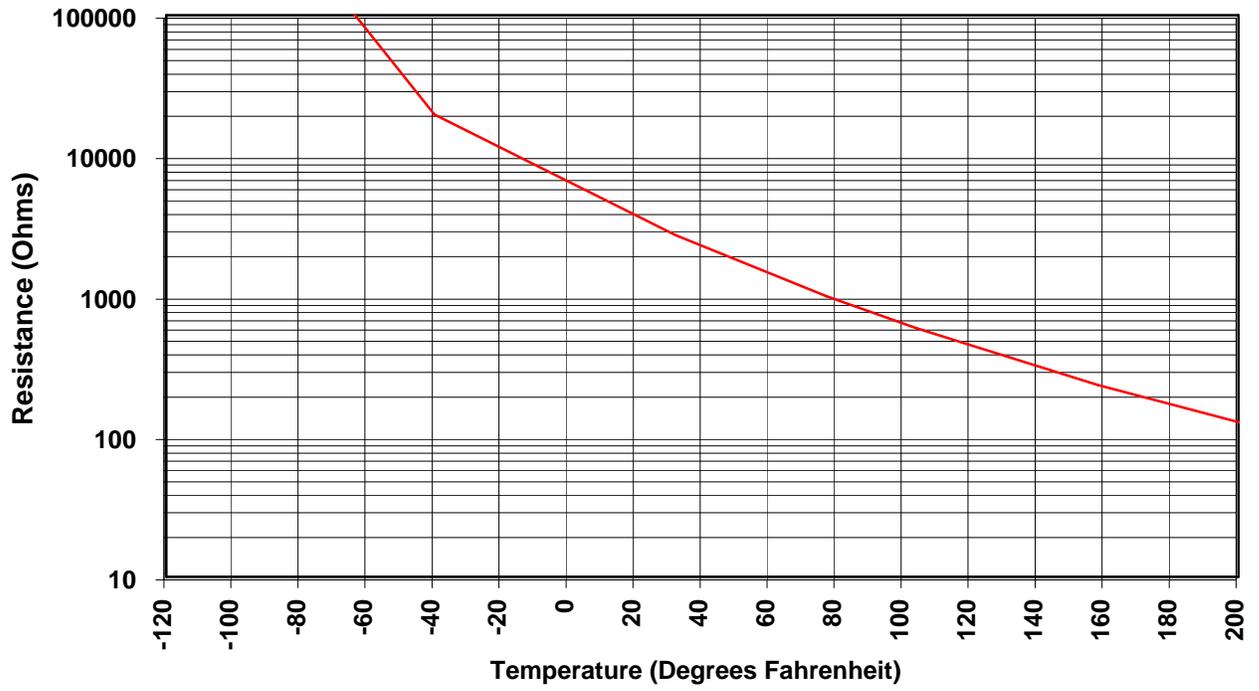
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FIGURE 2. Layout of cells and sensors.



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FIGURE 3. Electrical schematic of sensor/connector.



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FIGURE 4. Thermistor characteristics.

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NOMENCLATURE:	BATTERY, STORAGE, AIRCRAFT NICKEL-CADMIUM, HIGH RATE, LOW-MAINTENANCE, VENTED, LIMITED-REPAIR
MILITARY PIN:	M81757/14-1
NATIONAL STOCK NUMBER:	6140-**-***-****
NOMINAL VOLTAGE:	24 VOLTS
MAXIMUM WEIGHT:	17.5 LB.
INITIAL CAPACITY:	7 AH (5.5 AMPS/75 MINUTES/24 °C /19 V)
MINIMUM CAPACITY:	5.5 AH (5.5 AMPS/1 HR/24 °C /19 V)
CONTRACT AND DELIVERY ORDER NUMBER:	***
MANUFACTURED BY:	***
MANUFACTURER'S CAGE:	***
MANUFACTURER'S SERIAL NUMBER:	***
DATE/LOT CODE:	***
DATE FIRST PLACED IN SERVICE:	

FIGURE 5. Marking for M81757/14-1 battery.

REQUIREMENTS:

1. Part or identifying number. The part or identifying number (PIN) of the battery shall be M81757/14-1. The M81757/14-1 is a limited repair, low-maintenance, vented battery.
2. Dimensions and weight. The dimensions and the configuration of the battery container shall be as shown on figure 1. The weight of the battery shall be not greater than 17.5 pounds (7.94 kg).
- * 3. Capacity. Modifications to MIL-PRF-81757 requirements 3.10.14, 3.10.14.1, and 3.10.14.2.1 are as follows:
 - * 3.10.14 Capacity. Delete the first sentence and insert: “The initial capacity of the battery shall be not less than 7 Ampere-hours (Ah). The minimum capacity of the battery shall be not less than 5.5Ah.
 - * 3.10.14.1 Initial capacity. Delete the text and substitute: “To comply with the initial capacity requirement, each cell shall produce a potential of not less than 0.95 volts not less than 75 minutes into the constant 5.5 ampere discharge after being tested in accordance with 4.5.13 as modified herein at 24 °C ambient temperature.”

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3.10.14.2.1 Low-maintenance vented batteries. Delete the text and substitute: “The minimum capacity of the battery shall be not less than 5.5 Ah. The minimum capacity of the battery shall be based on its ability to comply with the 1C-rate capacity requirement. To comply with the 1C-rate capacity requirement, the battery shall produce a potential of not less than 19.0 volts not less than 60 minutes into the constant 5.5-ampere discharge at 24 °C ambient temperature.”

* 4. Harness assembly. Each battery shall include a harness assembly, which shall be attached as shown on figure 2 of this specification sheet. The wiring configuration of the battery and harness assembly shall conform to figure 3 of this specification sheet. The harness assemble shall have the capability of being removed and reinstalled in the battery with not more than two cells being removed during the process. All electrical connections made to the receptacle and harness devices shall be potted with a compound that will not support flame, absorb moisture, flow, crack, or shrink during any of the tests of 4.5 of MIL-PRF-81757. The harness assembly and potting compound shall meet the requirements of 3.10.3 of MIL-PRF-81757.

* 5. Thermoswitches. The harness assembly shall have two temperature sensor/switching devices connected in series to provide a signal for high temperature conditions. If thermoswitches are used, they shall be environmentally (shock, altitude, and vibration), and functionally equivalent to MIL-PRF-24236 for type I, class 4 switches. The devices shall open when the battery temperature is $71 \text{ }^\circ \pm 2.8 \text{ }^\circ\text{C}$ ($160 \text{ }^\circ \pm 5 \text{ }^\circ\text{F}$) and close when the battery temperature drops to $62.8 \text{ }^\circ \pm 2.8 \text{ }^\circ\text{C}$ ($145 \text{ }^\circ \pm 5 \text{ }^\circ\text{F}$).

* 6. Temperature sensor. The harness assembly shall use two temperature sensor devices with a resistance output conforming to figure 4 of this specification sheet. If thermistors are used, they shall conform to MIL-PRF-23648 or equivalent.

* 7. Interface requirements. The cells and other interior components of the battery shall be arranged and positioned as shown on figure 2 of this specification sheet. The cell terminals shall be vertically and horizontally positioned so that each cell terminal shall mate with its matching electrical connection of the cell scanner fixture and cell equalization fixture. The components and fasteners specified on figure 2 of this specification sheet are required due to interfaces with the MS3509-28 receptacle, the cell scanner fixture, and the cell equalization fixture.

* 8. MIL-PRF-81757 variance. The battery shall comply with MIL-PRF-81757 with modifications as follows:

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Modify the following paragraphs, tables, and figure:

* 3.7.2 Battery container and cover. Delete the first sentence and substitute: "The battery container and cover shall be made of a material that is impervious to salt spray and to an aqueous solution of potassium hydroxide of 1.30 ± 0.04 specific gravity (see 6.10.1 of MIL-PRF-81757) and an alternate electrolyte if used. The cover shall either be made of a material or protected with a material (such as paint, epoxy, or powder coating) that is impervious to salt spray and to an aqueous solution of potassium hydroxide of 1.30 ± 0.04 specific gravity (see 3.8.1 and 6.10.1 both of MIL-PRF-81757) and an alternate electrolyte if used. Such protective materials shall not be applied to the battery container except as indicated in 3.8.1 of MIL-PRF-81757."

* 3.7.5 Handles. Delete the title and text and substitute: "Carrying strap. The battery cover shall have a carrying strap located as shown on figure 1 of this specification sheet. Fasteners or adhesive methods shall not be used to mount the carrying strap. The carrying strap shall be free of any coating and shall meet the requirements of 3.9, 3.10.3 both of MIL-PRF-81757, and 3.10.25 as modified herein. The dimensions of the carrying strap shall be as shown on figure 1 of this specification sheet."

* 3.7.8 Receptacles. Add the following after the last sentence: "The battery shall contain two receptacles. The J2 receptacle shall conform to MS3509-28. The MS3509-28 main power receptacle shall be vertically positioned so that the top of the terminal block and the cell terminal contact surfaces are in the same plane. The J1 sensor receptacle shall be dimensionally equal to MS3474-L12-10PN, the receptacle shall be located as shown on figure 1 of this specification sheet, and the key of the receptacle shall be in the 12 o'clock position. Electroless nickel plating or cadmium plating shall not be used on the shell of the J1 sensor receptacle. The shell of the J1 sensor receptacle shall not be made of aluminum or aluminum alloy."

3.7.11.6 Vented filler cap. Add the following after the last sentence: "Each cell shall contain a vented filler cap conforming to PIN M81757/2-3 for the M81757/14-1 battery."

* 3.8.4.1 Limited-repair batteries. In the first sentence delete "figure 1" and substitute "figure 5 of this specification sheet."

3.8.7 Cell electrolyte level marking (low-maintenance vented batteries only). Delete everything after the first sentence and insert: "Each cell baffle shall contain a electrolyte level indicator between one-eighth and one-fourth inch above the bottom of the baffle."

3.10.10 Handle strength. Delete each mention of "handle(s)" in the title and text and insert "carrying strap."

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* 3.10.22 Constant voltage discharge. Not applicable.

* 3.10.23 Cycling. Delete the text (including all subparagraphs) and substitute the following: "When cycled in accordance with 4.5.23 as modified herein at ambient conditions of 4.4.1 of MIL-PRF-81757, qualification inspection batteries shall provide not less than 1000 cycles of charge and discharge and Group C inspection batteries shall provide not less than 600 cycles of charge and discharge. During the life test, inability to meet the 1-hour rate discharge requirement shall constitute a failure."

3.10.25 Physical integrity at high temperature. In the first sentence, delete "handles" and substitute "carrying strap."

4.5.9 Handle strength test. Delete each mention of "handle" in the title and text and insert "carrying strap". In the first sentence, delete "600 newtons (135 pounds)" and substitute "155.6 newtons (35 pounds)."

* 4.5.13.1 Low-maintenance vented batteries. In the first sentence, delete "1.0 volts" and substitute "0.95 volts."

* 4.5.14 Humidity and charge retention test. Delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

* 4.5.15 Shock test (basic design). Delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

* 4.5.16 Vibration test. Delete the text and substitute the following: "Remove the cover from the battery. Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757. Secure the cover onto the battery. Subject the battery to the vibration test of MIL-STD-810, method 514.4, procedure I and condition I-3.4.3. Use the test time schedule and curve for 'general' equipment location (figure 514.4-9). Discharge the battery at the 0.1 C-rate during vibration. During the vibration test, monitor the battery voltage. Upon completion of the vibration, constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757 and then discharge the battery at the 30C-rate for 60 ± 2 seconds. Examine the battery for the requirements of 3.9 of MIL-PRF-81757."

* 4.5.17 Temperature shock test. Delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

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* 4.5.18 Altitude test. In step a, delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757." In step e, delete the text and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

* 4.5.20 Twenty-second pulse discharge test. In step a, delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

4.5.21 Medium rate discharge, operating position test. In step a, delete the second and third sentence and insert: "Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757."

4.5.22 Constant voltage discharge. Delete.

* 4.5.23 Cycling test. Delete paragraphs b, c, d, e, and f and substitute the following:

* b. Cycle the battery as follows:

* (1) Constant current charge of 7.5 amperes to 30 volts.

* (2) Constant potential charge of 30.0 volts for 5 minutes.

* (3) Rest the battery on open circuit for 15 minutes.

* (4) Discharge at 10 amperes for 3 minutes.

* c. Repeat step 4.5.23.b continuously for the number of cycles listed below:

* (1) A total of 1000 cycles for qualification inspection batteries.

* (2) A total of 600 cycles for group C inspection batteries.

* d. Capacity discharge: Discharge batteries at room temperature at the C-rate to 0.95 volts times the number of active cells that the battery contains. Examine the battery for the requirements of 3.10.23 as modified herein."

* 4.5.24.2 Group C testing. In step a, delete the second and third sentences and insert: "Constant potential charge the battery in accordance with 4.4.2 of MIL-PRF-81757."

* 4.5.25 Physical integrity at high temperature. In step a, delete the text and insert:

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"Constant current charge the battery in accordance with 4.4.3 of MIL-PRF-81757." In step c, delete "handles" and substitute "carrying strap".

6.1 Intended use. Add the following after the last sentence: "The M81757/14-1 limited-repair battery is designed so that its cells and all components associated with installing the cells cannot be removed and replaced. The battery should be requisitioned and used only by those DoD Departments and Agencies whose aircraft battery maintenance/repair policies, procedures, and practices disallow the battery's cells to be removed and replaced."

* TABLE III. Qualification inspection of batteries. For the visual and mechanical test (test number 2), add "requirements 4, 5, 6, and 7" to the requirement paragraph column. For the dimensions and weight test (test number 4), add "requirement 2" to the requirement paragraph column. Delete the title of test number 5 and insert "Carrying strap strength test". For the initial capacity discharge test (test number 8), add "requirement 3" to the requirement paragraph column.

TABLE VIII. Group C inspection. For the visual and mechanical test (test numbers I-2, II-1, and III-1), add "requirements 4, 5, 6, and 7" to the requirement paragraph column. For the dimensions and weight test (test number I-3), add "requirement 2" to the requirement paragraph column. For the initial capacity discharge tests (test numbers I-6, II-5, and III-4), add "requirement 3" to the requirement paragraph column.

FIGURE 1. Marking for limited-repair batteries. Delete the figure and insert figure 5 contained herein.

CHANGES FROM PREVIOUS ISSUE: The margins of this specification are marked with asterisks to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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