TICKLER # _____ AC/S EMD 7

UNITED STATES MARINE CORPS
Marine Corps Base
PSC Box 20004
Camp Lejeune, North Carolina 28542-0004

5000
BEMD
10/15/93

From: Assistant Chief of Staff, Environmental Management
Via: Department Secretary
To: ECD

Subj: CDR MICOM REDSTONE ARS MSG 060523Z OCT 93
Hazard Classification of Stinger Battery Coolant Unit (SCU)

1. Required Completion Date: _____

2. Action Required: FYI

3. Additional Comments/Remarks: _____

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U U L A S S I F I E D
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EMD

ROUTINE

R 060523Z OCT 93 PSN 622877B32

FM CDR MICOM REDSTONE ARS AL//AMSMI-MMC-MM-DT//

TO AIG 7543
CDR RRAD TEXARKANA TX//SDSRR-ZT//
CDR 60TH APS TRAVIS AFB CA//TROKS//
CDR 437TH APS CHARLESTON AFB SC//APL//
CDR MTMC FALLS CHURCH VA//MTOP-SS//
CDR 436TH APS DOVER AFB DE//TROO//

INFO CDR LOGSAPSCC TOBYHANNA PA//AMXLS-TP-T//
CDR MICOM REDSTONE ARS AL//AMSMI-SF/AMSMI-MMC-MM-DP//
PEO TACTICAL MISSILE REDSTONE ARS AL//SFAE-MSL-FAD-SS//

UNCLAS

SUBJECT: HAZARD CLASSIFICATION OF STINGER BATTERY COOLANT UNIT (BCU)

A. CODE OF FEDERAL REGULATIONS, CFR 49, TRANSPORTATION, PARTS

107-180, 1 OCT 90, UPDATED BY FEDERAL REGISTER, VOL 55, NO. 246, DATED 21 DEC 90.

B. FONECON BETWEEN LARRY D. JOHNSON AND RANDY DRIGGARS, U.S. ARMY

MISSILE COMMAND (MICOM) TRANS, AND KEVIN WOODSINGER, MICOM SAFETY, 27 SEP 93.

1. THE LITHIUM THERMAL BATTERY OF THE STINGER BCU HAS BEEN HISTORICALLY HAZARD CLASSIFIED UNDER THE OLDER VERSION OF CFR 49 AND THE JOINT HAZARD CLASSIFICATION SYSTEM (JHCS) CURRENTLY IDENTIFIES SUBJECT ITEM AS FOLLOWS:
   A. HAZARD CLASS/DIVISION/STORAGE GROUP: 1.4S
   B. PROPER SHIPPING NAME: ARTICLES, EXPLOSIVE, N.O.S.
   C. UN NUMBER: 0349

2. ACCORDING TO REF A, THE NEW VERSION OF CFR 49, THE FOLLOWING STINGER BCU NATIONAL STOCK NUMBERS (NSN'S) ARE NOW CLASSIFIED AS:
   A. NSN'S: 1440-01-113-6327 PN01
   1440-01-122-1084 PN01

BLOG(1)...ACT FOR CG MCB CAMP LEJEUNE(5) 17341/ 2/0128
BTMO(1) BCOS(1) BCEO(1) BADJ(1)

RTD:000-000/COPIES:0005

622877/287 1 OF 2 MATA0129 287/18:37Z 060523Z OCT 93
CSN:AUI303996 287/18:38Z CDR MICOM REDS

NSN: 6135-00-464-7584
ITEM NAME: BATTERY,NONRECHARGEABLE
DA: , ,ISC: 5 INC: 35499

No Obsolete NSN's

Manufacturer's Part Number Information:

CAGE	---MANUFACTURER'S PART NUMBER---	RNVC	RNCC	---SADC---
07216	792-6005-001	2	3	
	ROCKWELL INTERNATIONAL OF CANADA LTD COLLINS CANADA DIV 150 BARTLEY DR TORONTO ONT CAN M4A 1C7			
13499	792-6005-001	9	5	
	ROCKWELL INTERNATIONAL CORP COLLINS GOVT AVIONICS DIV 400 COLLINS RD NE CEDAR RAPIDS IA, 52498 PHONE 319-395-5561			
95105	792-6005-001	2	5	
	ROCKWELL INTERNATIONAL CORP COLLINS DEFENSE COMMUNICATIONS 350 COLLINS RD NE CEDAR RAPIDS IA, 52498-0100 PHONE 319-395-1000			
80058	BA3553U	2	5	
	JOINT ELECTRONICS TYPE DESIGNATION SYSTEM			
08150	Y1142-11	2	5	
	UNION CARBIDE CANADA LTD 123 EGLINTON AVE TORONTO ONT CAN M4P 1J3 PHONE 416-488-1444			

ML-C Information:

ACT	SA	SOS	AAC	QUP	UNIT PRICE/UI	SLC	SEC	RC	MGMT CONTROL	PMI	ADP	DML	PC
	DA	S9G	V	1	$16.51/EA	M	U	Z	E2200X-	A	0	A	
	DS	S9G	V	1	$16.51/EA	M	U	N	--------	A	0	A	
	DF	S9G	V	1	$16.51/EA	M	U	N	SF9---N	A	0	A	
	DN	S9G	V	1	$16.51/EA	M	U		9G------	A	0	A	

No D043 Information

AMDF Information:

INSTRUCTIONS O.P. 469-44

REV D

APPROVED 12/10A

OPERATING INSTRUCTIONS

ITEM: BATTERY, STORAGE

MODEL: BB462/U (4 X LR28)

YARDNEY PART NO: 17338

NOMINAL CAPACITY: 28 AH

NOMINAL VOLTAGE UNDER LOAD: 6 VOLTS

BATTERY CONDITION (AS SUPPLIED): DRY, UNCHARGED

PREPARED R.M. Cantatore
12/10A

APPROVAL R. Dubois 10-17-83
DATE

Yardney
ELECTRIC CORPORATION
YARDNEY ELECTRIC DIVISION

82 MECHANIC STREET
PAWCATUCK, CONNECTICUT 02891
(203) 599-1100

ECN NO 17176 Rev C A-A R
REV. D

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Battery, Storage, BB 462/U is a silver-zinc alkaline secondary battery. Silver and zinc are employed as the electrodes. The electrolyte is a strong solution of potassium hydroxide (KOH).

1.2 The battery is constructed of a four cavity cell or monoblock. Each cell cavity has a capacity of 28 ampere hours. The cells in each monoblock are connected in series.

1.3 This battery is shipped in the dry uncharged state. It must be filled with electrolyte according to Section 3 and charged per Section 4 before it is ready for use.

1.4 The battery has the following electrical and physical characteristics:

Initial Voltage (OCV)	7.44
Minimum Usable Voltage	5 Volts
Capacity	28 Ampere Hours
Size	3.29L x 2.58W x 5.92H
Weight (Wet)	3 pounds, 8 ounces

2.0 PRECAUTIONS

2.1 For Handling Electrolyte

2.1.1 General Comments

The electrolyte (a strong solution of potassium hydroxide) is alkaline and corrosive. It should be handled with care. If neglected, the electrolyte will cause serious burns when it is permitted to come in contact with the eyes or skin. Alkali-proof apron, rubber gloves and splash-proof goggles or a face mask are recommended for personnel engaged in the filling and servicing of these batteries.

2.1.2 Antidotes, Internal

Give large quantities of water and a weak acid solution such as: vinegar, lemon juice, or orange juice. Follow with one of the following: white-of-egg, olive oil, starch water, mineral oil, or melted butter. Obtain medical attention at once.

2.1.3 Antidotes, External

2.1.3.1 For the Skin: Wash the affected areas with large quantities of water. Neutralize with vinegar, lemon juice, or 5% acetic acid, and wash with water. Obtain medical attention if burns occur.

2.1.3.2 For the Eyes: Wash with saturated solution of boric acid or flood with water. Use this first aid treatment until medical aid can be summoned.

2.1.4 Do not, under any circumstances, use any type of electrolyte other than that furnished in the filling kit supplied with the BB-462 battery. Other types of electrolyte (such as sulfuric acid) will damage or destroy the battery.

2.1.5 For Storing Electrolyte

Store the electrolyte in closed alkali-resistant plastic containers as it absorbs carbon dioxide from the air. Prolonged exposure to the air will impair the properties of the electrolyte.

2.2 For Handling the Battery

2.2.1 This battery is capable of supplying unusually high currents if it is accidentally shorted. A prolonged short may cause serious burns to personnel and may destroy the battery. To avoid accidental short circuits, all tools used in connection with the battery or within close vicinity of the battery must be properly insulated with a double layer of electrical tape or any other suitable insulator.

3.0 PREPARING THE BATTERY FOR SERVICE

3.1 Filling the Battery with Electrolyte

NOTE: Batteries not to be used within 30 days of receipt should be stored in the dry condition as delivered.

3.1.1 Each battery is furnished with a filling kit containing the following items:

Item	Quantity	Description
1	4	4 oz. polyethylene filling bottles; each containing 61cc Type B (40%) of electrolyte, the amount needed to fill one cell of the battery.
2	1	Filling nozzle assembly.
3	1	Cell screw valve assembly (spare).
4	4	Vent cleaners
5	4	Q-tips
6	1	Puncturing tool (golf tee)
7	1	Operating Procedure, O.P. 469-44
8	2	Polyethylene gloves

3.2 To properly fill each cell of the monoblock/battery with electrolyte, proceed as follows:

3.2.1 Remove the cell vent valve assembly from each cell of the battery. Retain, as they will be reinserted after filling.

3.2.2 Remove the cap from an electrolyte bottle containing the proper amount of electrolyte for only one cell.

3.2.3 Carefully puncture the seal on top of the bottle using the tool provided in the Filling Kit.

3.2.4 Screw one filling nozzle assembly, provided in the filling kit, securely onto the electrolyte bottle by applying a torque of approximately 3 to 5 in-lbs.

CAUTION: Do not squeeze electrolyte bottle when screwing nozzle on.

3.2.5 Screw the filling nozzle tip into the cell vent threaded hole, turning clockwise to a flush fit by applying a torque of approximately 4 to 6 in-lbs.

NOTE: Do not over torque, stripping of vent hole will result.

CAUTION: Take care when screwing nozzle into cell vent so as not to spill electrolyte.

3.2.6 Squeeze the electrolyte bottle gently, maintaining the pressure for a few seconds to avoid drawing back electrolyte into the bottle. Repeat this operation slowly until all of the electrolyte has been transferred into the cell. If the electrolyte is repeatedly drawn back into the bottle, wait for a few minutes until the level in the cell decreases: then introduce the remaining electrolyte into the cell. Do not remove the filling bottle from the cell until all the electrolyte is transferred into the cell. The time required to get all the electrolyte from the bottle into the cell is approximately 5-10 minutes.

3.2.7 After filling is completed, remove any excess electrolyte from the vent hole by using the vent cleaner. Insert a vent cleaner, up to the knot, into the cell vent hole and turn for one complete revolution. Use a new vent cleaner for each cell.

3.2.8 Remove any excess electrolyte from around the outside of the vent holes with cotton Q-tip provided.

3.2.9 Temporarily replace the cell vent valve assembly into the cell vent hole after the removal of the excess electrolyte is completed.

3.2.10 Repeat steps 3.2.2 through 3.2.9 for each cell of the monoblock as soon as possible. After all four cells of the monoblock are filled, the cell vent valves should be removed for the duration of the specified soak period (para. 3.3)

NOTE: Do not start filling an individual monoblock if time will not allow completion of the entire monoblock to be filled within a half hour.

3.2.11 After filling of the first monoblock has been completed, the filling nozzle assemblies should be removed from the empty filling bottles, the filling bottles discarded and filling nozzle assemblies retained for use on full bottles for filling of the next monoblock.

3.3 Soaking Period

After filling the battery with electrolyte, allow the battery to stand in normal upright position and soak for a minimum of 72 hours before charging.

NOTE: After the 72 hour soaking period, replace all vent valves and torque each valve to 4-6 in lbs. Caution should be taken not to over torque vent valves since stripping of vent hole may result.

4.0 CHARGING REQUIREMENTS

Connect the battery to the charger and follow instructions of para. 5.

4.1 Charger Details

The charger should be capable of supplying a constant current of at least 1.35 amperes and terminate the charge automatically when charging voltage of 8.0 $\pm$ 0.1 is reached.

4.2 Charging Temperature

Best performance will be obtained if the battery is charged at temperatures between 68° and 95°F.

4.3 Charging Position

The battery should be charged in the normal upright position.

5.0 CHARGING PROCEDURE

After the battery has been filled and soaked for the required time, connect the battery to the charger and begin the charge. Record the following information:

a. Note the starting time of charge.

b. Note the time when the charge ends.

5.1 Excessive Charge Input

If the time on charge exceeds 24 hours at the charger current, the battery may have a shorted cell. This can be determined either by a serviceability check (Section 6.3) or by visual examination of the battery during charge. A cell is probably shorted if during charge the other cells are gassing heavily and cutoff does not occur. A battery containing a shorted monoblock should be returned for salvage.

6.0 BATTERY MAINTENANCE

6.1 Preventive maintenance is required to keep the battery in optimum operating condition. Cell tops and terminals should be kept clean and dry (any corrosion due to atmospheric conditions should be removed immediately). The cell vent holes should be inspected periodically to assure that they are not clogged. Also, any cell vent valves which are found to be saturated with electrolyte should be cleaned or replaced.

6.2 To assure maximum intercell conductivity, it is also recommended to check occasionally the tightness of the top terminal nuts. Each top terminal nut should be tightened to a torque of 8-10 in lbs.

6.3 Electrolyte Level

No adjustments or additions of electrolyte are required during the life of this battery if the proper amount has been added initially. However, the electrolyte level in the cells should be examined to see if it is uniform from cell to cell. Variations up to one inch are permissible. However, larger variations may indicate improper addition of electrolyte. Report such batteries to next echelon for possible correction of the electrolyte quantity.

6.4 Battery Serviceability Check

Upon completion of charge, allow the battery to stand for a period of 6 to 12 hours and then check the open circuit voltage of each cell. The battery is fit for service if the open circuit voltage of all cells reads above 1.82 volts.

7.0 STORAGE

The table below lists the storage life as a function of temperature and condition.

Storage Life

Condition:	0°F	80°F	120°F	150°F
Dry:	5-10 Years	3 Years	2 Years	1 Year
Wet Discharged:	4 Years	2 Years	1 Year	2 Months
Wet Charged:	3 Years	1 Year	3 Months	3 Weeks

The preferred method of storage is dry.

7.1 Wet, Discharged Storage

After addition of electrolyte, the rate of deterioration in the uncharged state is only 1/3 that of the charged state.

7.2 Charged Storage

Retention of capacity of a filled and charged battery can be improved by using temperatures lower than room temperature for storing the battery. These temperatures can be as low as $0^{o}F$, with retention of capacity improving as the storage temperature is decreased.

The table below gives the approximate rate of capacity loss during charged stand as a function of temperature. If the loss of capacity is excessive, give the battery a booster charge before placing in service.

Capacity Loss During Charged Stand

Temperature	Percent per Month
$0^{o}F$	0.5%
$80^{o}F$	7.5%
$120^{o}F$	25-30%
$160^{o}F$	70-100%

8.0 STATE OF CHARGE

The battery, when fully charged, has an open circuit voltage of 7.2 to 7.4 volts (1.82 to 1.86 volts per cell). After approximately 30% of the initial ampere hour capacity has been discharged, the open circuit voltage will drop to about 6.4 volts (1.6 volts per cell), and will continue to read this value until the battery is exhausted. If the open circuit voltage of the battery is less then 7.2 volts, it is not fully charged and may be given a further charge if full battery capacity if required.

9.0 CYCLE LIFE

Approximately 50 cycles (full charge and discharge) are obtainable before the capacity of the battery falls below 20 AH (4 hours of service at 5 Amps). However, the extended storage at temperatures above $80^{o}F$ will decrease the number of cycles.

10.0 DISPOSITION WHEN BATTERY IS EXPENDED

When the battery fails to deliver the required output due to loss of capacity or shorting, it should be turned in for salvage.