

INCH-POUND

MIL-PRF-32271/15

9 June 2010

PERFORMANCE SPECIFICATION SHEET

BATTERY, NON-RECHARGEABLE, LITHIUM

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product herein shall consist of this specification sheet and MIL-PRF-32271.

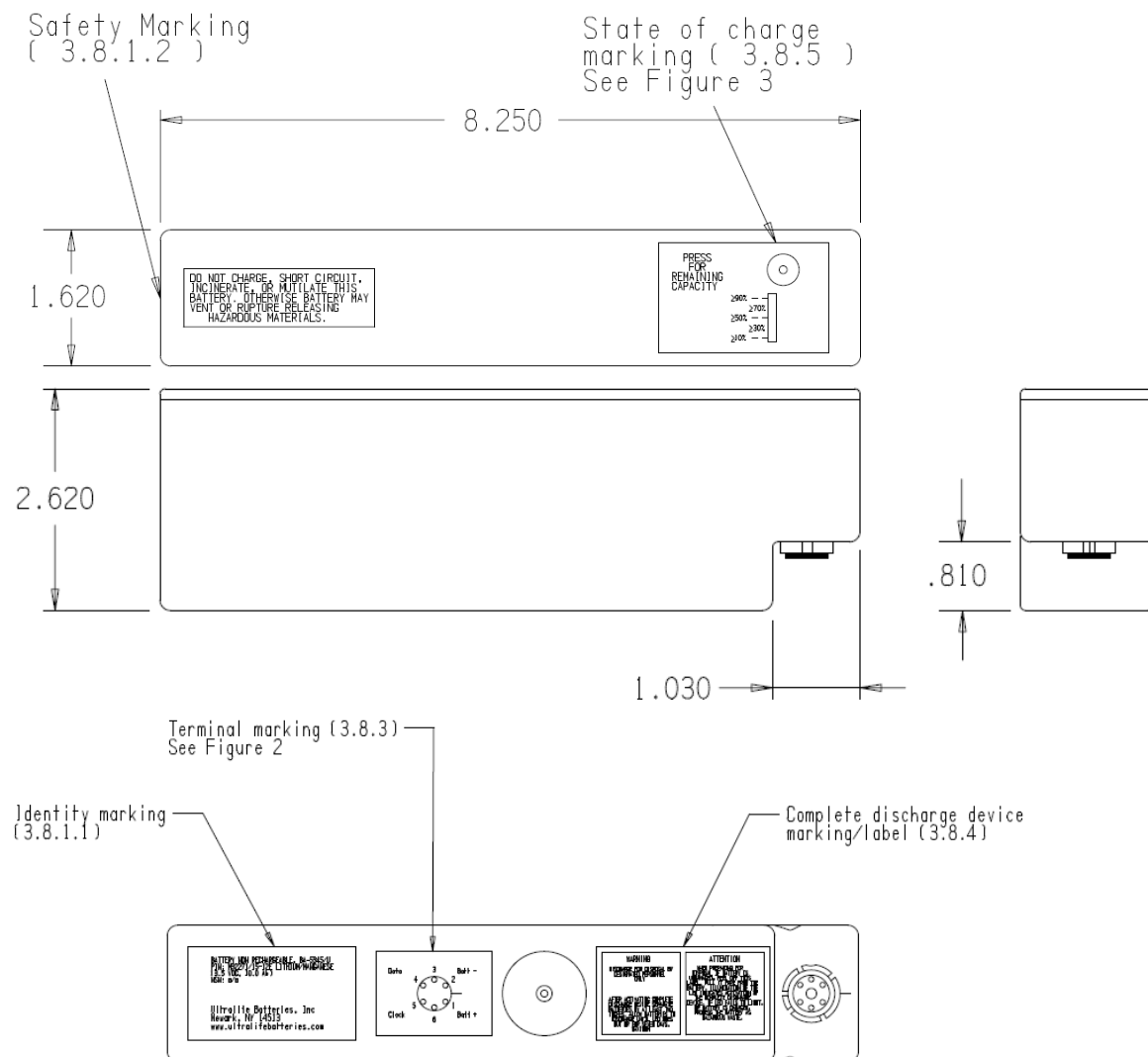


FIGURE 1 —M32271/15-12E Dimensions and marking locations

FIGURE 1 NOTES:

All dimensions are in inches

Tolerance for all is ± 0.031 inches

AMSC N/A

FSC 6135

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited

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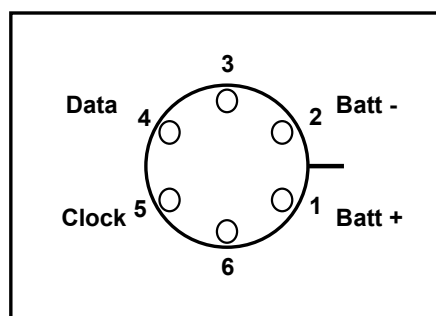


FIGURE 2: Terminal marking detail

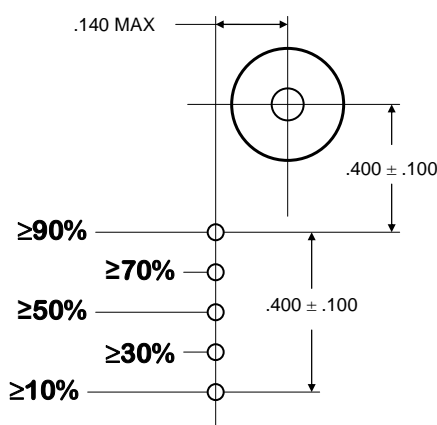


FIGURE 3: State of charge indicator detail

FIGURE 3 NOTE:

All dimensions are in inches

REQUIREMENTS (see 1.2 for Type, Class, and Features descriptions):

Type – I

Class – 2

Features – E

PIN – M32271/15-12E

Approved chemistry: Lithium manganese dioxide (Li/MnO₂)

Specification requirements: The following requirements of MIL-PRF-32271, identified therein as “when specified”, are applicable as indicated below:

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Requirement	Specification Reference	Applicability
Parallel cell arrangements	3.4	No
Connectors ¹	3.4.5	Yes
Battery charger connection	3.4.5.1	No
Connection integrity	3.4.5.2	No
Terminal integrity	3.4.6	No
Socket strength	3.4.6.1	No
Terminal strength	3.4.6.2	No
Complete discharge device	3.4.7	Yes
State of charge device	3.4.8	Yes
State of charge data output	3.4.8e	Yes
Cell charging	3.5.3	Yes
Nail penetration	3.5.4	Yes
Cell series string short circuit	3.5.6	No
Parallel string charge protection	3.5.6.1	No
Charge protection	3.5.11	Yes
Over-current protection	3.5.13.1	Yes
Over-temperature protection	3.5.14	Yes
Surface temperature	3.6h	Yes
Capacity tests LR and LRT		No
Immersion	3.7.8	No
Watertight integrity ¹	3.7.9	Yes
DO NOT CHARGE! marking	3.8.1.2b	No
Complete discharge device marking/label	3.8.4	Yes
State of charge marking	3.8.5	Yes

Dimensions, marking and configuration

Battery Connector – Glenair Part Number 807 198 07ZNU6 6DY
Mating Connector – Genair Part Number 807-162-06ZNU6-6PYB
Battery Charger Connector – Not Applicable

Battery voltages (3.4.4 & 4.6.1.5):

Battery open-circuit voltage (3.4.4.1 & 4.6.1.5.1):

Maximum – 16.50 volts

Minimum – 14.90 volts

Battery closed circuit voltage (3.4.4.2 & 4.6.1.5.2):

For capacity, initial voltage delay, and closed circuit voltage test:

Minimum – 10.0 volts

Cell closed circuit voltage test (3.4.4.3 & 4.6.1.3): Minimum - 2.0 volts per cell

Maximum weight (3.1 & 4.6.1.6): 1.75 lbs. (794 g)

¹ As modified by variances herein

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Complete discharge device (3.4.7): The Light Emitting Diode (LED) shall be located on the same battery face as the activator for the Complete Discharge Device (CDD).

Capacity test requirements (3.6 & 4.6.4):

Test	Initial voltage delay		Minimum Capacity	Cut-off Volts	
	Time (MAX)	to Volts			
I	1 second	10.0	6.1 hours		10.0
L	1 second	10.0	4.0 hours		10.0
H	1 second	10.0	5.1 hours		10.0
Storage Period					
			1-Week	4-Week	
IT	1 second	10.0	5.7 hours	5.5 hours	10.0
LT	1 second	10.0	3.7 hours	3.6 hours	10.0
HT	1 second	10.0	4.7 hours	4.6 hours	10.0

Abuse test pulse discharge capacity requirement (3.5.12 & 4.6.2.12i): 9.4 ampere-hours.

METHODS OF EXAMINATION AND TEST:

Verification requirements. The following verification requirements of MIL-PRF-32271, identified therein by the phrase "when specified," are applicable as indicated below:

Test Requirement	Specification Reference	Applicability
Parallel discharges	Tables III, IV, IX, & XI	No
Connector ²	4.6.1.7	Yes
Battery charger connection test	4.6.1.7.1	No
Static connection integrity	4.6.1.7.2	No
Dynamic connection integrity	4.6.1.7.3	No
Terminal integrity	4.6.1.8	No
Socket strength	4.6.1.8.1	No
Terminal strength	4.6.1.8.2	No
Complete discharge device	4.6.1.9	Yes
State of charge device	4.6.1.10	Yes
Cell charging	4.6.2.3	Yes
Nail penetration	4.6.2.4	Yes
Cell series string short	4.6.2.6	No
Parallel cell charge protection	4.6.2.6.1	No
Charge protection test	4.6.2.11	Yes
Battery over-current protection	4.6.2.13	Yes
Battery over-temperature protection	4.6.2.14	Yes
Surface temperature	4.6.4.1	Yes
Capacity test LR	4.6.4.1.5	No
Capacity test LRT	4.6.4.1.9	No
Immersion	4.6.5.8	No
Watertight integrity ²	4.6.5.9	Yes

² As modified by variances herein

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Cell closed-circuit voltage test: When cells are tested as specified in 4.6.1.3, load each cell with 2 amperes constant current, 1 ohm constant resistance, or 4 watts constant power.

Battery closed-circuit voltage test: When tested as specified in 4.6.1.5.2, load each battery with 2 amperes constant current, 5 ohms constant resistance, or 20 watts constant power.

Abuse test, pre-discharge: When tested as specified in 4.6.2.12a, discharge with a load of 2.0 amperes for 2.5 hours.

Abuse test, pulse discharge: When tested as specified in 4.6.2.12i, discharge with a load of 2.6 amperes for 1 minute followed by 1.7 amperes for 4 minutes, cycled continuously to 10.0 volts.

Battery over-current protection: When tested as specified in 4.6.2.13, load batteries with either 5 amperes or 60 watts.

Watertight integrity: When tested as specified in 4.6.5.9 as modified herein, apply a load of 18 watts during the time periods specified.

Capacity tests (4.6.4):

Test	Discharge Rate		Duty Cycle
	Pulse	Background	
I	36W	17.6W	Duty cycle described below to cut-off volts, followed by 2.6 amperes to zero volts, then 2.0 amperes forced discharge for 5 minutes.
L	36W	17.6W	Duty cycle described below to cut-off volts
H	36W	17.6W	Duty cycle described below to cut-off volts
IT	36W	17.6W	Duty cycle described below to cut-off volts
LT	36W	17.6W	Duty cycle described below to cut-off volts
HT	36W	17.6W	Duty cycle described below to cut-off volts

DUTY CYCLE: Continuous duty cycles shall consist of 36 watts for 2% and 17.6 watts for 98% of the cycle time. The 2% portion of the cycle shall be within the range of 2 milliseconds to 2 seconds. The same time values shall be used for all cycles on a given discharge test.

VARIANCES: The battery shall comply with MIL-PRF-32271 except as follows.

Requirements

Battery enclosure (3.4.3) Delete the following sentence from the eighth line: "Enclosure material shall be non-metallic" and replace with: "Conditioning (i.e., painting, plating, etc.) of the primary material is allowed in order to meet the electromagnetic compatibility requirement of 3.4.11."

Connectors (3.4.5) Delete in its entirety and replace with the following:

3.4.5 Connectors. The battery shall have a Glenair Part Number: 807 198 07ZNU6 6DY connector. Location of the connector shall be in accordance with Figure 1. When connected to mating connector 807-162-06ZNU6-6PYB, insertion force shall not exceed 15 \pm 3 pounds and extraction force shall not be less than 15 \pm 3 pounds. Continuity through the mating connector shall be demonstrated in accordance with 4.6.1.7.

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Add the following new paragraph:

3.4.11 Electromagnetic compatibility. The battery shall be electromagnetically compatible with the Ground Soldier System. When tested as specified in 4.6.1.11, batteries connected to the system shall meet the requirements of MIL-STD-461 for each of the following tests: CS114; CS115; CS116; RE101; RE102; RS101; RS103.

Watertight integrity (3.7.9) Delete in its entirety and replace with the following:

3.7.9 Watertight integrity. Batteries shall retain their watertight integrity and shall be capable of continuous use when immersed in water. During immersion, batteries shall be loaded and battery voltage shall remain above 10 volts. After immersion, battery weight gain shall be not greater than 0.1 gram. After the batteries have been tested as specified in 4.6.5.9 as modified herein, they shall meet the visual, mechanical and battery voltage and capacity requirements.

Verification

Add the following to Table V - Group V Battery Inspections and Tests:

Group No.	Sample Size	Inspection	Requirement Paragraph	Test Method Paragraph
V C 3/	5	Electromagnetic interference test	3.4.11	4.6.1.11

Add the following note:

3/ The Group V C batteries will increase the size of the Group V from 46 to 51; Group V C batteries will be subject to all tests specified for the Group V batteries prior to separation into subgroups A, B, and C.

Add the following new paragraph:

4.6.1.11 Electromagnetic interference test. The tests specified in MIL-STD-461 for the following parameters shall be performed on batteries connect to the Ground Soldier System: CS114, CS115, CS116, RE101, RE102, RS101, and RS103.

Altitude (4.6.5.1) During exposure to low pressure, the open circuit voltage of the undischarged batteries shall be monitored and shall meet the requirement of 3.4.4.1.

Vibration, Method 2 (4.6.5.3.2) Delete in its entirety and replace with the following:

4.6.5.3.2 Method 2. The batteries shall be subjected to Procedure I – General Vibration IAW Test Method 514 of MIL-STD-810. The random vibration levels shall comply with Category 24 Minimum Integrity Test requirements, and the test duration shall be no less than one hour for each of three orthogonal axes. Upon completion of the vibration test, battery voltage shall be tested in accordance with 4.6.1.5 for compliance to 3.4.4 and the batteries shall be examined for the visual and mechanical defects identified in Table XIV.

Mechanical shock, Method 2 (4.6.5.4.2) Delete in its entirety and replace with the following:

4.6.5.4.2 Method 2. The batteries shall be subjected to the test of Method 516, Procedure I of MIL-STD-810. The peak saw-tooth shock pulse of 40 g's and duration of 11 ms shall be used. Each battery shall be secured to the testing machine by means of a rigid mount.

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Each battery shall be subjected to a total of three shocks of equal magnitude. The shocks shall be applied in each of three mutually perpendicular directions for rectangular configurations or two for cylindrical configurations. Each shock shall be applied in a direction normal to a face of the battery. The faces of the battery are identified by their position in relation to the face, which bears the electrical connector. Upon completion of the vibration test, battery voltage shall be tested in accordance with 4.6.1.5 for compliance to 3.4.4 and the batteries shall be examined for the visual and mechanical defects identified in Table XIV.

Drop test (4.6.5.5) Delete the statement "Drop each battery once from a height of 30 ± 2 inches onto a hard surface consisting of concrete" (lines 7 & 8), and replace with: "Drop each battery twice from a height not less than 90 inches onto three inches of ½-inch gravel backed by concrete." All other test method requirements of 4.6.5.5 apply to the M32271/15-12E battery.

Thermal shock (4.6.5.6) Delete references to "5 minutes" in steps 2 and 4 and replace with "1 minute." All other test method requirements of 4.6.5.6 apply to the M32271/15-12E battery.

Watertight integrity (4.6.5.9) Delete in its entirety along with all sub-paragraphs and replace with the following:

4.6.5.9 Watertight integrity. The batteries shall be subjected to Test Method 512, Procedure I of MIL-STD-810. Use salt water substitute prepared in accordance with ASTM D-1141 for the test. Batteries shall be weighed in steps 1 and 7. Prior to the start of the test, the battery temperature shall be no less than 81°F (27°C) above the water temperature and the battery shall be at a full state of charge. Install a sealed mating connector to the battery connector. The battery shall be completely immersed, in an upright orientation. The uppermost point of the battery shall be maintained at a depth not less than 1 meter beneath the surface of the water. Once immersed, the battery shall be loaded with a constant 18-watt load. In Step 6, the immersion time shall be 2 hours, and wiping or blotting shall be the only acceptable methods of drying. In Step 8, remove any small amounts of water by wiping or blotting. Upon completion of the test, remove the sealed mating connector. Upon completion of the watertight integrity test, battery voltage shall be tested in accordance with 4.6.1.5 for compliance to 3.4.4 and the batteries shall be examined for the visual and mechanical defects identified in Table XIV.

NOTES:

(This section contains information of a general nature which may be helpful, but is not mandatory)

Intended use: This battery is intended for use in the Ground Soldier System. Please note that this battery must be electromagnetically compatible with the Ground Soldier System. Such compatibility is no guarantee of similar compatibility with any other system. Electromagnetic compatibility with any other system needs to be evaluated separately, and in the case of failure, either that system will need to adjust to this battery or another battery will need to be developed.

³Nominal ratings: The following are the nominal ratings for the battery described by this specification sheet. They are provided for information purposes.

³ Capacity and energy delivered by a battery are significantly affected by usage conditions, such as temperature and loads applied. If you have any questions about use of this battery in a particular device or circumstance, please visit the following web site (contact info is posted): <http://www.cerdec.army.mil/c2d/armypower>.

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Battery PIN:	M32271/15-12E (Li/MnO₂)
<i>Overall Dimensions::</i>	8.25 in. x 1.62 in. x 2.62 in.
<i>MAX Weight:</i>	1.75 lbs (739 grams)
<i>Voltage Range:</i>	10.0-16.5
<i>Nominal Capacity: (in ampere-hours)</i>	10.5 Amp-hrs
<i>Nominal Energy: (in watt-hours)</i>	132 Watt-hrs
<i>MAX rated power output:</i>	36 watts
<i>MAX continuous load rating:</i>	2.0 amperes
<i>MAX pulse load rating:</i>	5.0 amperes
<i>Instantaneous trip rating:</i>	10.0 amperes
<i>Operating temperature range:</i>	-20 to 130°F (-29 to 55°C)
<i>Storage temperature range:</i>	-40 to 160°F (-40 to 71°C)
<i>MAX abusive temperature: (non-operating)</i>	195°F (91°C)

Other data:

Military Type Designations. No version of this battery has been tested, evaluated, or used under any military type designations prior to release of this specification sheet. Early versions of this battery were identified as "LM-145". The type designation BA-5345/U has been approved for use with the M32271/15-12E battery.

This battery is subject to the transportation requirements of 49 CFR 173.185. The battery has solid cathodes and more than 2.0 grams of lithium content. See applicable Material Safety Data Sheet (MSDS) for the maximum lithium weight per cell and battery. It should be noted that all non-rechargeable lithium batteries are restricted from shipment as cargo aboard passenger aircraft within, entering, or leaving the US.

This battery includes a complete discharge device in order to render the battery non-reactive after use. If the battery is damaged, or if the device does not operate as indicated by an amber or yellow light, the battery is considered reactive waste. This battery may be recycled after use. Universal waste rules, where applicable, apply only when recycling is the chosen disposal method.

The US Army CECOM Life Cycle Management Command (LCMC) publishes guidelines for the design of battery compartments for devices using the battery covered by this specification sheet: Technical Bulletin CECOM-TB-7. Please contact the CECOM LCMC Directorate for Safety at monm-amselsfsec@conus.army.mil for further information.

Navy safety tests of NAVSEA S9310-AQ-SAF-010 are required for this battery during first article testing. The test data provided from the testing will be used to evaluate applications for specific using devices and Navy platforms. Devices using this battery will require US Navy Safety Approval prior to use by Department of Navy users unless such approval has already been granted. Please consult with NAVSEA Instruction 9310.1 for further information.

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This battery is required to be electromagnetically compatible with the Ground Soldier System. Verification requirements include electromagnetic interference tests of MIL-STD-461 with the battery connected to the system. Battery vendors will need to coordinate with the Project Manager, Soldier Warrior (SWAR), in order to arrange to have their products evaluated in the system. Their address is: Project Manager, Soldier Warrior, ATTN: SFAE-SDR-SWAR, 10125 Kingman Road, Building 317, Fort Belvoir, VA 22060-5820.

Custodians:

Army – CR
Navy – SH
Air Force – 99
DLA – CC

Preparing activity:

Army – CR
(Project Number 6135-2010-029)

Review activities:

Navy – AS, MC
Air Force – 71

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