

INCH-POUND

MIL-PRF-32271/13

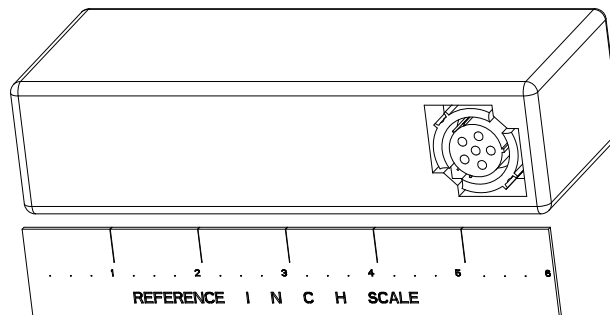
30 October 2008

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 and MIL-PRF-32271.



See NOTES
for nominal
dimensions;
see
applicable
drawing for
dimensional
requirements

Figure 1 – General View, M32271/13 Battery Shape

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

Type - I	Type - II	Type - III
Class - 2	Class - 2	Class - 2
Features - C	Features - C	Features - C
PIN: M32271/13-12C	PIN: M32271/13-22C	PIN: M32271/13-32C
Approved Chemistry: Lithium manganese dioxide	Approved Chemistry: Lithium sulfur dioxide	Approved Chemistry: Lithium manganese dioxide

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	
		Types I & III	Type II
Parallel cell arrangements ¹	3.4	Yes	No
Connectors	3.4.5	Yes	Yes
Battery charger connection	3.4.5.1	No	No
Connection integrity	3.4.5.2	Yes	Yes
Terminal integrity	3.4.6	No	No
Complete discharge device	3.4.7	Yes	Yes
State of charge device	3.4.8	No	No
State of charge data output	3.4.8e	No	No
Cell charging	3.5.3	Yes	Yes
Nail penetration	3.5.4	Yes	No
Cell series string short circuit	3.5.6	Yes	No
Parallel string charge protection ²	3.5.6.1	Yes	No
Charge protection	3.5.11	Yes	Yes
Over-current protection	3.5.13.1	Yes	Yes
Over-temperature protection	3.5.14	Yes	Yes
Surface temperature	3.6h	Yes	Yes
Capacity tests LR and LRT		No	Yes
Immersion	3.7.8	Yes	Yes
Watertight integrity	3.7.9	No	No
DO NOT CHARGE! marking	3.8.1.2b	No	No
Complete discharge device marking/label	3.8.4	Yes	Yes
State of charge marking	3.8.5	No	No

Dimensions, marking and configuration, Types I, II, & III

Battery – Drawing A3315890

Battery Connector (3.4.5 & 4.6.1.7) – Drawing SC-C-179492³

Mating Connector (3.4.5 & 4.6.1.7) – Part Number SM-D-687888-1, Drawing SM-D-687888

Battery Charger Connector (3.4.5.1 & 4.6.1.7.1) – Not Applicable

Battery voltages (3.4.4 & 4.6.1.5):

Battery open-circuit voltage (3.4.4.1 & 4.6.1.5.1):

Type:	Types I & III	Type II
<i>Maximum:</i>	9.9 volts	9.15 volts
<i>Minimum:</i>	9.0 volts	8.7 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 – 6.0 volts

¹ Parallel cell arrangements are permitted but not required

² Only required if parallel cell arrangements are used

³ Certifications for physical properties of connector material required by SC-C-179492

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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): Type I - 1.5 lbs. (680 g); Type II – 1.0 lbs. (454 g); Type III – 1.6 lbs. (726 g)

Capacity test requirements (3.6 & 4.6.4), Type I:

Test	Initial voltage delay		Minimum Capacity	Cut-off Volts	
	Time (MAX)	to Volts			
I	1 second	6.0	5.0 hours	6.0	
L	1 second	6.0	3.0 hours	6.0	
H	1 second	6.0	8.3 hours	6.0	
Storage Period					
			<u>1-Week</u>	<u>4-Week</u>	
IT	1 second	6.0	4.7 hours	4.5 hours	6.0
LT	1 second	6.0	2.8 hours	2.7 hours	6.0
HT	1 second	6.0	7.7 hours	7.5 hours	6.0

Capacity test requirements (3.6 & 4.6.4), Type II:

Test	Initial voltage delay		Minimum Capacity	Cut-off Volts	
	Time (MAX)	to Volts			
I	5 seconds	6.0	3.4 hours	6.0	
L	60 seconds	6.0	2.0 hours	6.0	
H	5 seconds	6.0	6.2 hours	6.0	
LR	5 seconds	6.0	47.0 hours	1.0	
Storage Period					
			<u>1-Week</u>	<u>4-Week</u>	
IT	5 seconds	6.0	3.1 hours	3.0 hours	6.0
LT	60 seconds	6.0	1.9 hours	1.8 hours	6.0
HT	5 seconds	6.0	5.8 hours	5.6 hours	6.0
LRT	5 seconds	6.0	43.7 hours	42.3 hours	1.0

Capacity test requirements (3.6 & 4.6.4), Type III:

Test	Initial voltage delay		Minimum Capacity	Cut-off Volts	
	Time (MAX)	to Volts			
I	1 second	6.0	5.8 hours	6.0	
L	1 second	6.0	3.0 hours	6.0	
H	1 second	6.0	9.7 hours	6.0	
Storage Period					
			<u>1-Week</u>	<u>4-Week</u>	
IT	1 second	6.0	5.4 hours	5.2 hours	6.0
LT	1 second	6.0	2.8 hours	2.7 hours	6.0
HT	1 second	6.0	9.0 hours	8.7 hours	6.0

Abuse test pulse discharge minimum capacity requirement (3.5.12 & 4.6.2.12i): Type I - 9.4 ampere-hours; Type II – 6.2 ampere-hours; Type III – 10.8 ampere-hours.

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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	
		Types I & III	Type II
Parallel discharges	Tables III, IV, IX, & XI	No	No
Connector	4.6.1.7	Yes	Yes
Battery charger connection test	4.6.1.7.1	Yes	Yes
Static connection integrity	4.6.1.7.2	No	No
Dynamic connection integrity	4.6.1.7.3	No	No
Terminal integrity	4.6.1.8	No	No
Complete discharge device	4.6.1.9	Yes	Yes
State of charge device	4.6.1.10	No	No
Cell charging	4.6.2.3	Yes	Yes
Nail penetration	4.6.2.4	Yes	No
Cell series string short	4.6.2.6	Yes	No
Parallel cell charge protection ⁴	4.6.2.6.1	Yes	No
Charge protection test	4.6.2.11	Yes	Yes
Battery over-current protection	4.6.2.13	Yes	Yes
Battery over-temperature protection	4.6.2.14	Yes	Yes
Surface temperature	4.6.4.1	Yes	Yes
Capacity test LR	4.6.4.1.5	No	Yes
Capacity test LRT	4.6.4.1.9	No	Yes
Immersion	4.6.5.8	Yes	Yes
Watertight integrity	4.6.5.9	No	No

Cell closed-circuit voltage test: When cells are tested as specified in 4.6.1.3, load each cell to be used in a single series cell string design with 2 amperes constant current, 1 ohm constant resistance, or 4 watts constant power. In the event that parallel cell arrangements are used (Types I and III only), use a load that produces a current equivalent to 2 amperes divided by the number of parallel cell strings to be used, as a minimum.

Battery closed-circuit voltage test: When tested as specified in 4.6.1.5.2, load each battery with 2 amperes constant current, 3 ohms resistance, or 12 watts of 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 for Type I batteries; 1.7 hours for Type II batteries; 2.9 hours for Type III batteries.

Abuse test, pulse discharge: When tested as specified in 4.6.2.12i, discharge with a load of 2.5 amperes for 1 minute followed by 1.8 amperes for 4 minutes, cycled continuously to 6.0 volts.

Battery over-current protection: When tested as specified in 4.6.2.13, load batteries with either 4 amperes or 20 watts.

⁴ This test only required if parallel cell arrangements are used

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Immersion: When tested as specified in 4.6.5.8, apply a load of 1.2 amperes during the storage and immersion time periods specified.

Capacity tests (4.6.4):

Test	Discharge Rate	Duty Cycle
I	2.0 amperes	Continuous discharge to cut-off volts, followed by 2.0 amperes To zero volts, then 2.0 amperes forced discharge for 5 minutes.
L	2.0 amperes	Continuous discharge to cut-off voltage
H	2.0 amperes	Discharge for 5 minutes at 2 amperes, followed by 5 minutes on open circuit; repeat cycle continuously to cut-off voltage
LR	135 mA/1.7W	Continuous discharge at 135 milli-amperes to 6.5 volts, then Discharge at 1.7 watts to cut-off voltage
IT	2.0 amperes	Continuous discharge to cut-off voltage
LT	2.0 amperes	Continuous discharge to cut-off voltage
HT	2.0 amperes	Discharge for 5 minutes at 2 amperes, followed by 5 minutes on open circuit; repeat cycle continuously to cut-off voltage
LRT	135 mA/1.7W	Continuous discharge at 135 milli-amperes to 6.5 volts, then Discharge at 1.7 watts to cut-off voltage

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 digital communications terminals. It is also used to power some test sets.

⁵Nominal ratings: The following are the nominal ratings for the battery described by this specification sheet. They are provided for information purposes.

⁵ 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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<i>Battery PIN:</i>	M32271/13-12C	M32271/13-22C	M32271/13-32C
<i>Overall Dimensions:</i>	2.5 in. H x 6.0 in. W x 1.5 in. D		
<i>MAX Weight:</i>	1.5 lbs (680 grams)	1.0 lbs (454 grams)	1.6 lbs (726 grams)
<i>Voltage Range:</i>	6.0-9.9	6.0-9.15	6.0-9.9
<i>Nominal Capacity (Ampere-hours):</i>	10 Amp-hrs	6.8 Amp-hrs	11.6 Amp-hrs
<i>Nominal Energy (Watt-hours):</i>	78 Watt-hrs	53 Watt-hrs	90 Watt-hours
<i>MAX Rated Power Output:</i>	23 Watts		
<i>MAX Continuous Load Rating:</i>	2.0 Amperes		
<i>MAX Pulse Rating:</i>	2.5 Amperes		
<i>Instantaneous Trip Rating:</i>	4.0 Amperes		
<i>Operating Temperature Range:</i>	-20 to 130°F (-29 to 55°C)		-4 to 130°F (-20 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)		172°F (78°C)

Other data:

Military Type Designations. The military type designations that relate to the PINs covered by this specification sheet are as follows: The BA-5399()/U designation has been used for the Type I PIN; the BA-5599()/U designation has been used for the Type II PIN; and the BA-7599()/U designation was considered for prototypes of the Type III PIN.

All battery types covered by this specification sheet are subject to the transportation requirements of 49 CFR 173.185. Types I & III have solid cathodes and more than 2.0 grams of lithium content; type II has liquid cathodes and more than 1.0 grams of lithium. 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.

All battery types include a complete discharge device in order to render the battery non-reactive after use. If a 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 types I & II batteries covered by this specification sheet: Technical Bulletin CECOM-TB-7. Please contact the CECOM LCMC Directorate for Safety at nonm-amselsfsec@conus.army.mil for further information.

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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 either 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.

Custodians:

Army – CR
Navy – NW
Air Force – 99
DLA – GS

Preparing activity:

Army – CR
(Project Number 6135-2006-016)

Review activities:

Navy – SH, AS, MC
Air Force – 71

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