

INCH-POUND MIL-PRF-32271/7 30 October 2008
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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.

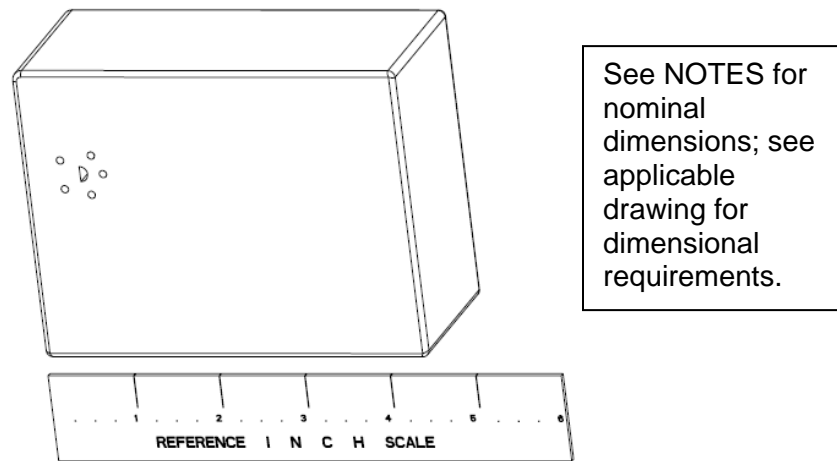


Figure 1 – General View, M32271/7 Battery Shape

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

<i>Type:</i>	I		II		III
<i>Class:</i>	2		2		2
<i>Features:</i>	C	E	C	E	E
<i>PIN:</i>	M32271/7-12C	M32271/7-12E	M32271/7-22C	M32271/7-22E	M32271/7-32E
<i>Approved Chemistry:</i>	Lithium Manganese Dioxide		Lithium Sulfur Dioxide		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 by PIN Suffix (M32271/7-)				
		12C	12E	22C	22E	32E
Parallel cell arrangements ¹	3.4	Yes	Yes	No	No	Yes
Connectors	3.4.5	Yes	Yes	Yes	Yes	Yes
Battery charger connection	3.4.5.1	No	No	No	No	No
Connection integrity	3.4.5.2	No	No	No	No	No
Terminal integrity	3.4.6	Yes	Yes	Yes	Yes	Yes
Socket strength	3.4.6.1	Yes	Yes	Yes	Yes	Yes
Terminal strength	3.4.6.2	No	No	No	No	No
Complete discharge device	3.4.7	Yes	Yes	Yes	Yes	Yes
State of charge device	3.4.8	No	Yes	No	Yes	Yes
State of charge data output	3.4.8e	No	Yes	No	Yes	Yes
Cell charging	3.5.3	Yes	Yes	Yes	Yes	Yes
Nail penetration	3.5.4	Yes	Yes	No	No	Yes
Cell series short circuit	3.5.6	Yes	Yes	No	No	Yes
Parallel string charge protection ²	3.5.6.1	Yes	Yes	No	No	Yes
Charge protection	3.5.11	Yes	Yes	Yes	Yes	Yes
Over-current protection	3.5.13.1	Yes	Yes	Yes	Yes	Yes
Over-temperature protection	3.5.14	Yes	Yes	Yes	Yes	Yes
Surface temperature	3.6h	Yes	Yes	Yes	Yes	Yes
Capacity LR & LRT		No	No	Yes	Yes	No
Immersion	3.7.8	Yes	Yes	Yes	Yes	Yes
Watertight integrity	3.7.9	No	No	No	No	No
DO NOT CHARGE! marking	3.8.1.2b	No	No	No	No	No
Complete discharge device marking/label	3.8.4	Yes	Yes	Yes	Yes	Yes
State of charge marking	3.8.5	No	Yes	No	Yes	Yes

Circuit protection devices (3.5.6.1; 3.5.11; 3.5.13.1; 3.5.13.2; & 3.5.14): All battery circuit protection devices (charge, over-current, and over-temperature) shall be electrically located so that the protection applies to either section A₁ or A₂.

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

Battery - Drawing A3315884

Battery Connector (3.4.5 & 4.6.1.7) – Drawing A3315884

Mating Connector (3.4.5 & 4.6.1.7) – Drawing SM-C-447075

Battery Charger Connector – Not Applicable

¹ Parallel cell arrangements are permitted for Types I and III batteries described by this specification sheet but are not required.

² Only required if parallel cell arrangements are used for Type I or III batteries

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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	
Section:	A ₁	A ₂	A ₁	A ₂
Maximum:	3.30	16.50	3.05	15.25
Minimum:	2.98	14.90	2.90	14.40

Battery closed circuit voltage (3.4.4.2 & 4.6.1.5.2):

For capacity, initial voltage delay, and closed circuit voltage test (A₂):

Minimum – 10.0 volts

Closed circuit voltage (A₁) Minimum: 2.2 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): Type I – 1.95 lbs. (885 g); Type II – 1.5 lbs. (680 g);
Type III – 2.05 lbs. (930 g)

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

Test	Initial voltage delay		Minimum Capacity	Storage Period		Cut-off Volts
	Time (MAX) to Volts			1-Week	4-Week	
I	1 second	10.0	5.3 hours		10.0	
L	1 second	10.0	2.8 hours		10.0	
H	1 second	10.0	9.1 hours		10.0	
IT	1 second	10.0	4.9 hours	4.8 hours	10.0	
LT	1 second	10.0	2.6 hours	2.5 hours	10.0	
HT	1 second	10.0	8.4 hours	8.2 hours	10.0	

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

Test	Initial voltage delay		Minimum Capacity	Storage Period		Cut-off Volts
	Time (MAX) to Volts			1-Week	4-Week	
I	5 seconds	10.0	3.8 hours		10.0	
L	60 seconds	10.0	2.0 hours		10.0	
H	5 seconds	10.0	6.5 hours		10.0	
LR	5 seconds	10.0	49.0 hours		1.5	
IT	5 seconds	10.0	3.5 hours	3.4 hours	10.0	
LT	60 seconds	10.0	1.9 hours	1.8 hours	10.0	
HT	5 seconds	10.0	6.0 hours	5.8 hours	10.0	
LRT	5 seconds	10.0	45.6 hours	44.1 hours	1.5	

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

Test	Initial voltage delay		Minimum Capacity	Storage Period		Cut-off Volts
	Time (MAX)	to Volts		1-Week	4-Week	
I	1 second	10.0	6.4 hours			10.0
L	1 second	10.0	2.8 hours			10.0
H	1 second	10.0	11.0 hours			10.0
IT	1 second	10.0	5.9 hours	5.7 hours		10.0
LT	1 second	10.0	2.6 hours	2.5 hours		10.0
HT	1 second	10.0	10.2 hours	9.9 hours		10.0

Abuse test pulse discharge capacity requirement (3.5.12 & 4.6.2.12i): Type I – 9.8 ampere-hours; Type II – 7.0 ampere-hours; Type III – 11.8 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 by PIN Suffix (M32271/7-)				
		12C	12E	22C	22E	32E
Parallel discharges	Tables III, IV, IX, & XI	Yes	Yes	Yes	Yes	Yes
Connectors	4.6.1.7	Yes	Yes	Yes	Yes	Yes
Battery charger connection	4.6.1.7.1	No	No	No	No	No
Static connection integrity	4.6.1.7.2	No	No	No	No	No
Dynamic connection integrity	4.6.1.7.3	No	No	No	No	No
Terminal integrity	4.6.1.8	Yes	Yes	Yes	Yes	Yes
Socket strength	4.6.1.8.1	Yes	Yes	Yes	Yes	Yes
Terminal strength	4.6.1.8.2	No	No	No	No	No
Complete discharge device	4.6.1.9	Yes	Yes	Yes	Yes	Yes
State of charge device	4.6.1.10	No	Yes	No	Yes	Yes
State of charge data output	4.6.1.10	No	Yes	No	Yes	Yes
Cell charging	4.6.2.3	Yes	Yes	Yes	Yes	Yes
Nail penetration	4.6.2.4	Yes	Yes	No	No	Yes
Cell series string short	4.6.2.6	Yes	Yes	No	No	Yes
Parallel string charge protection ³	4.6.2.6.1	Yes	Yes	No	No	Yes
Charge protection	4.6.2.11	Yes	Yes	Yes	Yes	Yes
Battery over-current protection	4.6.2.13	Yes	Yes	Yes	Yes	Yes
Battery over-temperature protection	4.6.2.14	Yes	Yes	Yes	Yes	Yes

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³ This test only required if parallel cell arrangements are used for Type I or III batteries

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Test Requirement	Specification Reference	Applicability by PIN Suffix (M32271/6-)				
		12C	12E	22C	22E	32E
Surface temperature	4.6.4.1	Yes	Yes	Yes	Yes	Yes
Capacity LR	4.6.4.1.5	No	No	Yes	Yes	No
Capacity LRT	4.6.4.1.9	No	No	Yes	Yes	No
Immersion	4.6.5.8	Yes	Yes	Yes	Yes	Yes
Watertight integrity	4.6.5.9	No	No	No	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 in the A₂ circuit with 2.0 amperes constant current, 5.0 ohms resistance, or 20 watts constant power. Load the A₁ circuit with 6.76 ohms.

Abuse test, pre-discharge: When tested as specified in 4.6.2.12a, discharge with a load of 2.0 amperes or 50 watts for: 2.6 hours for Type I batteries; 1.9 hours for Type II batteries; 3.2 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 ampere for 1 minute followed by 1.8 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 4.0 amperes or 48 watts.

Immersion: When tested as specified in 4.6.5.8, apply a load of 0.2 amperes during the storage and immersion time periods specified.

Capacity tests (4.6.4):

Test	Discharge Rate ⁴	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 10 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	160 mA/2.75W	Continuous discharge at 160 milli-amperes to 10.5 volts, then Discharge at 2.75 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	160 mA/2.75W	Continuous discharge at 160 milli-amperes to 10.5 volts, then Discharge at 2.75 watts to cut-off voltage

⁴ Apply all discharges to the A₂ section.

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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 radio sets, direction finding devices, and some radar sets. It is also used to power some types of communications security devices.

AN/PRC-25: Users of the AN/PRC-25, a 1950's vintage military radio, should be aware that while this battery will operate the radio, it will eventually result in early failures of a tube in the radio. This is due to the very low impedance of the lithium cells used to build this battery, causing high current drains that burn out a tube filament. Since the AN/PRC-25 was replaced decades ago, there is no plan to develop another battery for it. If you need to power an AN/PRC-25, there are two other options: search the commercial marketplace for alternates, or get a newer radio.

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

<i>Battery PIN:</i>	M32271/7-12C or -12E (Li/MnO ₂)	M32271/7-22C or -22E (Li/SO ₂)	M32271/7-32E (Li/MnO ₂)
<i>Overall Dimensions:</i>	3.6 in. H x 4.6 in. W x 2.06 in. D		
<i>MAX Weight:</i>	1.95 lbs (885 grams)	1.5 lbs (680 grams)	2.05 lbs (930 grams)
<i>Voltage Range:</i>	10.0-16.5	10.0-15.25	10.0-16.5
<i>Nominal Capacity (Ampere-hours):</i>	10.6 Amp-hrs	7.6 Amp-hrs	12.8 Amp-hrs
<i>Nominal Energy (Watt- hours):</i>	155 Watt-hrs	110 Watt-hrs	187 Watt-hours
<i>MAX Rated Power Output:</i>	25 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-5398()/U designation has been used for the Type I PIN; the BA-5598()/U designation has been used for the Type II PIN; and the BA-7598()/U designation was considered for prototypes of the Type III PIN.

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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This battery has a +3-volt voltage tap of the A₂ section connected to the A₁ section of the battery. It is intended for use by the AN/PRC-25⁶ only. However, users of the AN/PRC-25 should be aware that regular use of any lithium battery will burn out the filament in one of the vacuum tubes in the radio. A better choice would be the magnesium BA-4386/PRC-25 (6135-00-926-8322), or a newer radio. All other devices use the A₂ section only.

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 a liquid cathode 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 each 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. All three battery types 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 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 any of the three battery types covered by this specification sheet 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 6135-2006-010)

Review activities:

Navy – SH, AS, MC
Air Force – 71

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil> or <http://assist.daps.dla.mil/quicksearch/>.

⁶ The AN/PRC-25 was replaced by the AN/PRC-77 radio in the 1970's. The AN/PRC-77 has no vacuum tubes.