

INCH-POUND

MIL-STD-1860

21 December 1988

MILITARY STANDARD

BATTERIES, NON-RECHARGEABLE

SELECTION AND USE OF



AMSC N/A

FSC 6135

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FOREWORD

1. This military standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, LABCOM, Attn: SLCET-RS, Fort Monmouth, NJ 07703, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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1. SCOPE

1.1 Scope. This standard consists of selected standard non-rechargeable battery types for use in military equipment. It provides general information for the choice and application of non-rechargeable batteries. Detailed requirements for non-rechargeable batteries listed herein are covered in the applicable specification (see 2.1).

1.2 Purpose of standard. This standard provides the equipment designer with a selection of standard non-rechargeable batteries for use in military equipment. It is intended to minimize and control the variety of non-rechargeable batteries used in military equipment.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications. The following specifications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

MILITARY SPECIFICATIONS

| | |
|-----------------|--|
| MIL-B-49030(ER) | Batteries, Dry, Alkaline |
| MIL-B-49430(ER) | Batteries, Non-Rechargeable, Lithium Sulfur Dioxide |
| MIL-B-49458(ER) | Batteries, Non-Rechargeable, Lithium Manganese Dioxide |

2.1.2 Other Government documents and publications. The following other Government documents and publications form a part of this standard to the extent specified herein. Unless otherwise specified, the issues are those listed in the solicitation.

| | |
|------------|--|
| DOT-E-7052 | Transportation Exemption for Lithium Batteries |
| AFR 71-4 | Preparation of Hazardous Materials for Military Air Shipment |

(Copies of specifications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer).

2.2. Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 Battery. A portable electrochemical power source consisting of one or more electrochemical power cells with all necessary connectors, fusing, thermal protection devices, and wiring which are encased in a jacket to provide electrical power.

3.1.1 Standard battery. A battery of standard size and voltage that meets an applicable military specification for batteries including material of construction and safety features.

3.1.2 Non-rechargeable battery. A battery which derives its energy from an essentially irreversible electrochemical reaction and which is hence incapable of being efficiently recharged by an electric current.

3.2 Standard voltage. Standard voltages are those voltages most commonly used to power battery operated equipment. For the purpose of this standard, they include but are not limited to the following: 1.5, 3.0, 6.0, 9.0, 12.0, and 24.0 volts DC. These are the voltages under load. Standard voltage is also referred to as nominal voltage.

4. GENERAL REQUIREMENTS

4.1 Standard Types. Only non-rechargeable battery types listed in this standard shall be used in non-rechargeable battery operated equipment unless it is demonstrated that:

- (a) Batteries listed herein cannot meet the equipment power requirements.
- (b) Batteries not listed herein meet or exceed power and safety requirements of the equipment, while providing at the same time tactical, economic, and logistic advantages over the batteries listed herein.

4.2 Assignment of non-rechargeable battery types.

4.2.1 Non-standard batteries. The assignment of batteries not listed herein for military application shall be approved by the contracting agency. Request for approval to use batteries not listed herein shall be forwarded to military parts control advisory group (MPCAG) and the contracting agency. It shall be accompanied by written justification for selection of a non-standard battery.

5. DETAILED REQUIREMENTS

5.1 Characteristics of standard non-rechargeable batteries.

General physical and electrical characteristics of the standard non-rechargeable batteries are shown in Tables I and II. Detailed physical and electrical characteristics can be found in the applicable specification.

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TABLE I - Alkaline batteries.

| MIL-B-49030 Spec Sheet | Battery Nomen- clature | Nominal Voltage (Volts) | Cell Size | Height 1/ | Width1/ or Diameter | Length 1/ | Weight (Lbs) (Max) | Capacity (Amp-Hrs) 2/ |
|---------------------------|------------------------------|-------------------------------|--------------|--------------|---------------------------|--------------|--------------------------|-----------------------------|
| /1 | BA-3030/U | 1.5 | D | 2.41 | 1.34 | -- | 0.34 | 8.0 |
| /3 | BA-3042/U | 1.5 | C | 1.97 | 1.03 | -- | 0.15 | 3.56 |
| /6 | BA-3058/U | 1.5 | AA | 1.97 | 0.58 | -- | 0.05 | 1.25 |
| /11 | BA-3090/U | 9.0 | M2200 | 1.91 | 0.66 | 1.03 | 0.15 | 0.50 |

TABLE II - Lithium batteries.

| Specification Number | Battery Nomenclature | Nominal Voltage (Volts) | Height 1/ | Width1/ or Diameter | Length 1/ | Weight (LBS) (Max) | Capacity (Amp-Hrs) 2/ |
|-------------------------|-------------------------|-------------------------------|--------------|---------------------------|--------------|--------------------------|-----------------------------|
| MIL-B-49458/1 | BA-5372/U | 6 | 1.32 | 0.66 | ---- | 0.0438 | 0.45 |
| MIL-B-49430/6 | BA-5557/U | 12/24 | 3.94 | 1.48 | 4.18 | 1.1 | 2.25/4.50 |
| MIL-B-49430/4 | BA-5567/U | 3 | 0.75 | 1.06 | ---- | 0.04 | 0.85 |
| MIL-B-49430/7 | BA-5588/U | 12 | 3.76 | 1.24 | 3.56 | 0.65 | 2.90 |
| MIL-B-49430/3 | BA-5590/U | 12/24 | 5.00 | 2.45 | 4.40 | 2.25 | 6.90/13.80 |
| MIL-B-49430/2 | BA-5598/U | 12 | 2.06 | 3.56 | 4.69 | 1.5 | 7.20 |
| MIL-B-49430/1 | BA-5599/U | 9 | 2.50 | 1.50 | 6.00 | 1.0 | 6.90 |
| MIL-B-49430/8 | BA-5600/U | 9 | 7.34 | 1.56 | ---- | 0.8 | 6.00 |
| MIL-B-49430/11 | BA-5800/U | 6 | 5.06 | 1.40 | ---- | 0.48 | 6.90 |
| MIL-B-49430/5 | BA-5847/U | 6 | 3.78 | 1.53 | 2.58 | 0.53 | 6.90 |

1/ All dimensions are maximum and are in inches.

2/ Capacity is measured at 25°C.

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6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This standard is intended to be used by the equipment designer to assist in the selection of a standard non-rechargeable battery.

6.2 Subject term (key word) listing.

Alkaline
Battery
Cell
Lithium
Manganese Dioxide
Non-rechargeable
Sulfur Dioxide

6.3 Application notes.

6.3.1 Lithium batteries. These batteries shall be used for applications requiring high rate of discharge (i.e. greater than 150 mA) and for low temperature use. Operating temperature range is -28.9°C to $+55^{\circ}\text{C}$.

6.3.2 Alkaline batteries. These batteries shall be used for low to moderate rate of discharge (i.e. less than 150 mA). Operating temperature range is -17.8°C to $+55^{\circ}\text{C}$.

6.4 Storage information. Batteries shall not be stored near heat or open flames.

6.4.1 Lithium batteries. Lithium batteries should be used within five years of date of manufacture. These batteries shall be stored in a well ventilated area between temperatures of 0°C and 55°C .

6.4.2 Alkaline batteries. Alkaline batteries shall be refrigerated, if possible. These batteries should be used within three years of date of manufacture.

6.5 Transportation of lithium batteries. Commercial transportation of these batteries shall conform to DOT-E-7052. Military air transportation shall conform to AFR 71-4.

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6.6 Disposal information.

6.6.1 Lithium batteries. Upon completion of use, lithium batteries containing a complete discharge device may be disposed as normal trash after its discharge switch is activated. If the battery is not fully discharged, wait five days after activating the switch before discarding. Upon completion of use, lithium batteries not containing a complete discharge device shall be turned in for disposal to the regional Defense Reutilization Marketing Office (DRMO). Lithium batteries containing less than 0.5 grams of lithium (BA-5372/U and BA-5567/U) shall be excluded from the above policy. These lithium batteries containing less than 0.5 grams may be disposed of as normal trash.

6.6.2 Alkaline batteries. Alkaline batteries may be disposed of as normal trash.

Custodians:
 Army-ER
 Navy-SH
 Air Force -

Preparing Activity:
 Army-ER
 (Project 6135-0206)

Review Activity:
 Army - AR, AT, CR
 Navy - EC
 Air Force -
 DLA-GS

User Activity:
 Army-ME
 Navy -
 Air Force - 85

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

MIL-STD-1860

2. DOCUMENT TITLE

Batteries, Non-Rechargeable Selection and Use of

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

VENDOR

USER

MANUFACTURER

OTHER (Specify): _____

b. ADDRESS (Street, City, State, ZIP Code)

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

THE ARMY ELECTRONIC TECHNOLOGY
 CENTER (AETC) HAS REVIEWED
 THIS PROPOSAL AND HAS
 RECOMMENDED IT FOR
 APPROVAL.

6. REMARKS

7a. NAME OF SUBMITTER (Last, First, MI) - Optional

b. WORK TELEPHONE NUMBER (Include Area Code) - Optional

c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8. DATE OF SUBMISSION (YYMMDD)

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