Ministry of Defence
Defence Standard 61-19

Issue 2 Publication Date 22 August 2003

Guidance to the Transportation, Storage, Handling and Disposal of Lithium Batteries.

AMENDMENT RECORD

Amd No	Date	Text Affected	Signature and Date

REVISION NOTE

The standard has been revised to update its content

HISTORICAL RECORD

This standard supersedes the following:

Interim Defence Standard (Def Stan) 61-19 Issue 1 dated 20th March 1989.

CONTENT

PREFACE

Standards for Defence

Guidance to the Transportation, Storage, Handling and Disposal of Lithium Batteries.

a. This standard provides the relevant information and procedures to promote the safe handling of lithium batteries from acquisition to disposal.

b. This standard has been produced on behalf of the Defence Materiel Standardization Committee (DMSC), by the Defence Battery Standardization Committee (DBSC), as there is no suitable national or other standard, which is acceptable to the Ministry of Defence.

c. This standard has been agreed by the authorities concerned with its use and is intended to be used whenever relevant in all future designs, contracts, orders etc. and whenever practicable by amendment to those already in existence. If any difficulty arises which prevents application of this Defence Standard the UK Defence Standardization (DStan) shall be informed so that a remedy may be sought.

d. Any enquiries regarding this standard in relation to an invitation to tender or a contract in which it is incorporated are to be addressed to the responsible technical or supervising authority named in the invitation to tender or contract.

e. Compliance with this Defence Standard shall not in itself relieve any person from any legal obligations imposed upon them.

f. This standard has been devised solely for the use of the Ministry of Defence (MOD) and its contractors in the execution of contracts for the MOD. To the extent permitted by law, the MOD hereby excludes all liability whatsoever and howsoever arising (including, but without limitation, liability resulting from negligence) for any loss or damage however caused when the standard is used for any other purpose.

g. The sponsor of this standard is DPA ADRP3e.

TEXT

Standards for Defence

Guidance to the Transportation, Storage, Handling and Disposal of Lithium Batteries.

SECTION 1 GENERAL REQUIREMENTS

0 INTRODUCTION

0.1 Lithium cells and batteries are subject to legislation covering all phases of their use. The purpose of this document is to provide guidance on Lithium Battery issues and where the regulations are defined.

0.2 Lithium batteries are widely used in many types of equipment in the MOD. A wide variety of chemical systems, cell shapes and sizes are available. All lithium batteries and installations incorporating lithium batteries are encompassed within UN Dangerous Goods Classifications and allied transport regulations, which impose constructional, packaging and labelling requirements.

1 SCOPE

1.1 This standard is intended for use by MOD and Industry.

1.2 This standard may be invoked directly by a MOD invitation to tender, contract or referenced by other MOD battery specifications.

1.3 This standard applies to all rechargeable and non-rechargeable batteries containing lithium or lithium ions, both as single items and when contained in items of equipment. Thermal batteries may fall into a different classification within the relevant UN documents and further clarification should be sort.

2 WARNING

The Ministry of Defence (MOD), like its contractors, is subject to both United Kingdom and European laws regarding Health and Safety at Work, without exemption. All Defence Standards either directly or indirectly invoke the use of processes and procedures that could be injurious to health if adequate precautions are not taken. Defence Standards or their use in no way absolves users from complying with statutory and legal requirements relating to Health and Safety at Work.

SECTION 1 GENERAL REQUIREMENTS

3 RELATED DOCUMENTS

3.1 The publications shown below are referred to in the text of this standard. Publications are grouped and listed in alphanumeric order. These documents are subject to frequent change and or amendments.

Designation	**Title**
AMS	Acquisition Management System
AP 830 Vol1 Pt5 Leaflet E3/7	RAF Disposal Regulations
BR 1029 Vol6 Ch5	Naval Disposal Regulations
DEFCON 68	Supply of Hazardous Articles and Substances
DEFCON 129	Packaging
Def Stan 61-17	The Selection and Introduction of Batteries for Service Use
JSP 335	Dangerous Air Cargo Regulations
Materiel Regulations for Army Vol1 Pamphlet7	Army Disposal Regulations
D.E.T.R	www.detr.gov.uk Eland House Bressendon Place London SW1E 5DU
D.T.I	www.dti.gov.uk Enquiry Unit 1 Victoria Street London SW1H 0ET
H.S.E	www.hse.gov.uk HSE Infoline Caerphilly Business Park Caerphilly CF83 3GG

3.2 Reference in this standard to any related document means in any invitation to tender or contract the edition and all amendments current at the date of such tender or contract unless a specific edition is indicated.

3.3 In consideration of **3.2** above, users shall be fully aware of the issue and amendment status of all related documents, particularly when forming part of an invitation to tender or contract. Responsibility for the correct application of standards rests with users.

SECTION 1 GENERAL REQUIREMENTS

3.4 DStan can advise regarding where related documents are obtained from. Requests for such information can be made to the DStan Helpdesk. How to contact the helpdesk is shown on the outside rear cover of Def Stans.

4 DEFINITIONS

For the purpose of this standard the following definitions apply:

4.1 Mandatory Clauses in Defence Standards.

Defined as clauses that use the word “shall”. Optional or non-mandatory clauses use the word “should”.

4.2 Standard Sponsor.

Defined as the MOD sponsor for the preparation of a Defence Standard.

5 ABBREVIATIONS

Designation	Title
AMS	Acquisition Management System
AP	Allied Publication
AESP	Army Equipment Support Publication
BR	(NAVY) Book of Requirements
COSHH	Control of Substances Hazardous to Health
DACC	Dangerous Air Cargo Committee
DBSC	Defence Battery Standardization Committee
DEFCON	Defence Contract
Def Stan	Defence Standard
DStan	UK Defence Standardization
GB	Great Britain
IMO	International Maritime Organisation
JSP	Joint Services Publication
MOD	Ministry of Defence
TSBMA	Tri-Service Battery Management Authority
UK	United Kingdom
UN	United Nations

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SECTION 1 GENERAL REQUIREMENTS

6 CONTRACTUAL ISSUES

6.1 All contracts for supply of lithium cells or batteries shall include the requirements of DEFCON 68 (Supply of Hazardous Articles and Substances) and DEFCON 129 (Packaging). These shall also be applied to contracts covering the supply of any equipment that contains or is supplied with lithium cells or batteries.

6.2 Lithium cells and batteries are designated by the UN as Dangerous Goods, within the Recommendations on the Transport of Dangerous Goods Model Regulations. Consequently some products require assessment and testing to demonstrate compliance with constructional and performance requirements. All supplied products shall comply with the relevant constructional, performance, packaging and labelling requirements of the civil dangerous goods transport regulations governing land, sea and air modes of transport. Except where specified in the contract or excluded in the regulations, this shall include requirements for carriage on mixed passenger and cargo aircraft.

The specific battery **Def Stan 61-21** supplement or contract shall specify the packaging levels that require marking and any additional information required as part of the product or package labelling

7 HAZARDS

7.1 In addition to the high energy density. There are hazards with the constituents of these cells/batteries. Many cell variants are pressurised and may forcibly eject material if venting occurs. The lithium anodes are flammable, burn vigorously and react violently with water. Electrolytes often contain strong oxidising, reducing agents or organic salts that are dissolved in flammable organic liquids. Cathode materials may either be liquid, gaseous or solid. These materials are often highly toxic and can be irritant to eyes, skin and respiratory tract. Specific details on the hazards associated with individual products is contained within the MOD Hazardous Stores Information System (HSIS) and associated Safety Data Sheets.

7.2 Whilst some of the hazards are common to most cells and batteries, the specific hazard will depend on the chemistry, design of the product and its condition i.e. its state of charge. Electrical, physical or mechanical abuse may cause the release of the cell or battery contents possibly with spontaneous ignition or explosive consequences.

8 BATTERY SELECTION

8.1 The policy for the introduction and selection of lithium batteries in Defence equipment is given in **Def Stan 61-17**.

SECTION 2 TRANSPORTATION, STORAGE, HANDLING AND DISPOSAL REQUIREMENTS

9 TRANSPORT

Regulations vary depending on the mode of transport and the type of battery to be transported. Mode specific regulations can be found at the web sites referenced in **Clause 3**.

10 TRANSPORTATION OF UNSERVICEABLE ITEMS

Some Dangerous Goods Transport Regulations for Land and Sea do not distinguish between serviceable, unserviceable and defective items. Therefore they may, need further clarification from the regulatory authorities, see **Clause 3.** However for Air transport, serviceability criteria may apply.

11 PACKAGING

11.1 The packing must comply with the appropriate regulations and be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design must be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture

11.2 Batteries must be packed for transport in such a way that the batteries will not be short- circuited, inter-connected or damaged during transport. Regulations vary depending on the mode of transport and the type of battery to be transported. Any additional packaging requirements in the following sections shall be assessed.

11.3 Packaging shall not be removed until the battery is used.

12 LABELLING

12.1 In the absence of any specific contract requirements, and in addition to the regulatory requirements, the following additional information shall appear on the primary packaging and all subsequent layers of packaging;

- **a.** ‘LITHIUM BATTERY’ (in block capitals)
- **b.** Manufacturers name (preferably) or identification
- **c.** NATO Stock Number
- **d.** Nominal Battery Voltage
- **e.** ‘CAUTION: NEVER CHARGE, SHORT CIRCUIT, PUNCTURE, DEFORM OR INCINERATE’ (delete ‘CHARGE’ if the battery is a rechargeable type) (in block capitals)
- **f.** Date of Manufacture

Unless otherwise stated, a yellow triangle black edged and of side no shorter than 20mm, and containing the words ‘LITHIUM BATTERY’ in black, bold capitals

SECTION 2 TRANSPORTATION, STORAGE, HANDLING AND DISPOSAL REQUIREMENTS

13 DELIVERY

13.1 All phases of delivery shall comply with the relevant dangerous goods regulations as required. Care must be taken to ensure that packaging and labelling requirements are not compromised by inspection, acceptance of goods or onward conveyance.

13.2 All deliveries shall be accompanied with the relevant Health and Safety data together with an indication of conformance with the applicable regulations.

14 STORAGE

14.1 Refer to manufactures instructions.

14.2 Batteries should be stored in a well-ventilated, dry and cool condition. High temperature or high humidity may cause deterioration of the battery performance or surface corrosion.

14.3 When batteries are stored they should not be exposed to direct sun rays for a long time or placed in areas where they can get wet by rain. When batteries get wet, their insulation resistance decreases, self-discharge may occur and rust may be generated.

14.4 The storage area should be dry, well ventilated and should have a minimum one-hour fire capability. Humidity or temperature control will not be necessary in most cases. Exposure to temperatures above +50°C should be avoided and in no circumstances should temperatures exceed +70°C. Lithium batteries should be segregated by type with the minimum level of packaging. All pallets, shelving and supports on which batteries are stood should be of non-flammable material, and the store shall be clearly identified as containing flammable materials.

14.5 Persons responsible for the storage of lithium batteries should be aware of the relevant COSHH data and manufactures guidelines for the product and any local authority, national regulations and procedures.

15 HANDLING

15.1 Persons responsible for the transport, handling, storage and disposal of lithium batteries should be aware of the relevant COSHH data and manufactures guidelines for the product.

Do not handle battery cartons roughly. When battery cartons are handled roughly, the batteries may be dented or distorted and thus their performance is deteriorated, or batteries may leak. When battery cartons are damaged and many batteries are mixed together, they may be short-circuited or damaged by heat, or leak, explode and/or ignite.

SECTION 2 TRANSPORTATION, STORAGE, HANDLING AND DISPOSAL REQUIREMENTS

16 DISPOSAL

16.1 Prompt disposal of discharged and end of life cells and batteries is recommended as the hazards detailed in **7.1** still apply.

16.2 Persons responsible for the disposal of lithium batteries should be aware of the relevant COSHH data for the product and any local authority, national regulations and procedures.

16.3 The disposal of lithium batteries by the MOD shall be in accordance with the appropriate service regulations.

Inside Rear Cover

Defence Standards are Published by and Obtainable from:

Defence Procurement Agency
An Executive Agency of The Ministry of Defence
UK Defence Standardization
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File Reference

The DStan file reference relating to work on this standard is D/DStan/61/19.

Contract Requirements

When Defence Standards are incorporated into contracts users are responsible for their correct application and for complying with contractual and statutory requirements. Compliance with a Defence Standard does not in itself confer immunity from legal obligations.

Revision of Defence Standards

Defence Standards are revised as necessary by up issue or amendment. It is important that users of Defence Standards should ascertain that they are in possession of the latest issue or amendment. Information on all Defence Standards is contained in Def Stan 00-00 Standards for Defence Part 3 , Index of Standards for Defence Procurement Section 4 'Index of Defence Standards and Defence Specifications' published annually and supplemented regularly by Standards in Defence News (SID News). Any person who, when making use of a Defence Standard encounters an inaccuracy or ambiguity is requested to notify the Directorate of Standardization (DStan) without delay in order that the matter may be investigated and appropriate action taken.