



**Ministry of Defence
Defence Standard 61-21**

Issue 2 Publication Date 14th August 2009

**General Specification
For
Batteries**

Supplement 065

**Lithium Thionyl Chloride Battery
3.6V,
NSN 6135-01-435-5558**



AMENDMENT RECORD

Amd No	Date	Text Affected	Signature and Date

REVISION NOTE

This supplement has been revised to align its content with Def Stan 61-21 Issue 3 and the inclusion of a PAS.

The 300mA discharge requirement has been removed.

HISTORICAL RECORD

This standard supersedes the following:

Def Stan 61-21 Supplement 065/Issue 1.

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DEF STAN 61-21 SUPPLEMENT 065/2

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PREFACE

Standards for Defence

Specification for

3.6V Lithium Thionyl Chloride Battery

NSN 6135-01-435-5558

- a.** This supplement shall be read in conjunction with Def Stan 61-21.
- b.** This supplement provides a definitive specification for the electrical, physical, performance and nomenclature requirements for a 3.6V Lithium Thionyl Chloride battery.
- c.** This supplement 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 and its associated supplements, 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.

TEXT

Standards for Defence

3.6V Lithium Thionyl Chloride Battery

NSN 6135-01-435-5558

SECTION 1 GENERAL REQUIREMENTS

0 INTRODUCTION

It is Ministry of Defence (MOD) policy to purchase batteries against performance specifications whenever possible. Defence Standard 61-21 and its series of supplements has been generated to address the current requirements for batteries. This supplement is applicable when invoked directly by a MOD invitation to tender, contract, or when referred to by other MOD battery specifications.

1 SCOPE

This supplement provides a definitive specification for the electrical, physical, performance and nomenclature requirements for a 3.6V Lithium Thionyl Chloride battery, type ER14, NSN 6135-01-435-5558. This supplement invokes Basic Product Conformity Certification.

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 For the purposes of this supplement all related documents are listed in Defence Standard 61-21.

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.

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 Defence Standards.

4 DEFINITIONS

Def Stan 61-21 definitions shall apply.

5 ABBREVIATIONS

Def Stan 61-21 abbreviations shall apply.

SECTION 2 ELECTRICAL CHARACTERISTICS

6 ELECTROCHEMICAL SYSTEM

The electrochemical system shall be defined by BS EN 60086-1: system designation E.

7 NOMINAL AND OFF-LOAD VOLTAGE

The nominal and off-load voltage shall be defined by BS EN 60086-1: system designation E.

SECTION 3 PHYSICAL CHARACTERISTICS

8 BATTERY SYSTEM

The battery comprises a sealed bobbin ER14 size cell enclosed within a plastic sleeve. The battery shall be capable of continuous current loads of up to 100mA.

The cell shall incorporate a pressure relief mechanism that will relieve excessive internal pressure at a value and rate which will preclude explosion or self ignition.

The battery shall be designed such that it shall not leak, vent or explode under normal operation or storage.

9 BATTERY LIMITATIONS

It is essential that the battery be operated only within its design and performance parameters and that it is **NEVER RECHARGED, SHORT CIRCUITED, EXPOSED TO TEMPERATURES EXCEEDING 100°C, CRUSHED, PIERCED OR DEFORMED IN ANY WAY.**

10 DIMENSIONS

The dimensions of the batteries will be in accordance with BS EN 60086-2 type ER14 with the exception of:

- a) The maximum length (over the contact surfaces) shall be 50.4mm.
- b) The maximum diameter shall be 26.0mm.
- c) The negative terminal shall be a flat surface.

11 MASS

The nominal mass of the battery is 48g.

12 MARKING

Marking shall be in accordance with BS EN 60086-1 system designation E.

13 OPERATIONAL TEMPERATURE RANGE

The operational temperature range shall be -60°C to +85°C.

SECTION 4 PERFORMANCE REQUIREMENTS

14 DISCHARGE REQUIREMENTS

Prior to undertaking a discharge test, the batteries shall be pre-conditioned at the test temperature for a minimum of 16 hours.

The batteries shall be conditioned at the stated test temperature for a minimum of 16 hours prior to discharge. Throughout the test, the temperature shall be controlled to within $\pm 2^{\circ}\text{C}$.

When subjected to a continuous discharge load of $100\text{mA} \pm 1\text{mA}$ to an end-point of 2V the discharge duration shall be recorded and the capacity calculated. The minimum discharge capacity requirements are given in Table 1.

The voltage throughout the discharge shall be recorded. The battery voltage delay time to reach 2.0 Volts shall be measured and recorded.

Table 1 Duty Discharge Capacity Requirements			
Storage Regime and Load	Discharge Temperature and Minimum capacity (Ah) to 2 Volts		
	-40°C	+20°C	+55°C
Immediate 100mA	1.0	3.3	4.2
52 weeks Temperate 100mA	0.95	3.2	4.1
260 weeks Temperate 100mA	0.85	2.8	3.75

15 STORAGE REQUIREMENTS

15.1 Examination During Storage

At the start, and on completion of each storage test, the off-load voltage test (clause 7) shall be carried out, and the batteries examined. Any battery showing signs of leakage, corrosion or distortion shall be deemed to have failed.

15.2 Temperate Storage

Batteries shall be stored in an ambient temperature of $20 \pm 5^{\circ}\text{C}$ and a relative humidity between 45% and 75% for the specified duration.

SECTION 5 PRODUCT CONFORMITY CERTIFICATION

16 GENERAL REQUIREMENTS

The Product Conformity Certification requirements are defined in Section 2 of Def Stan 61-21.

16.1 Product Conformity Test Requirements

The test schedule shown in figure 1 shall apply for product conformity certification. All of the tests shall be carried out in the stated order. The number of samples for each test shall be in accordance with the supplier's quality procedures, but shall be not less than the minimum quantities shown in figure 1.

16.2 Interim Certification

Interim certification may be considered after the satisfactory completion of the tests marked '#1' in the schedule shown in figure 1.

16.3 Batch Certification

Under exceptional circumstances the acquirer may consider allowing a batch certification process when the build standard cannot be controlled or verified.

The supplier shall propose a batch certification plan to provide confidence that all aspects of the Interim PCC can be achieved prior to shipment. The supplier shall also include additional data to demonstrate the storage life of the product.

16.4 Periodic Verification of Critical Performance

All tests marked '#2' in the schedule shown in figure 1, shall be carried out in accordance with the contractor's quality procedures. Alternative tests may be adopted by the contractor, with the prior agreement of the Authority.

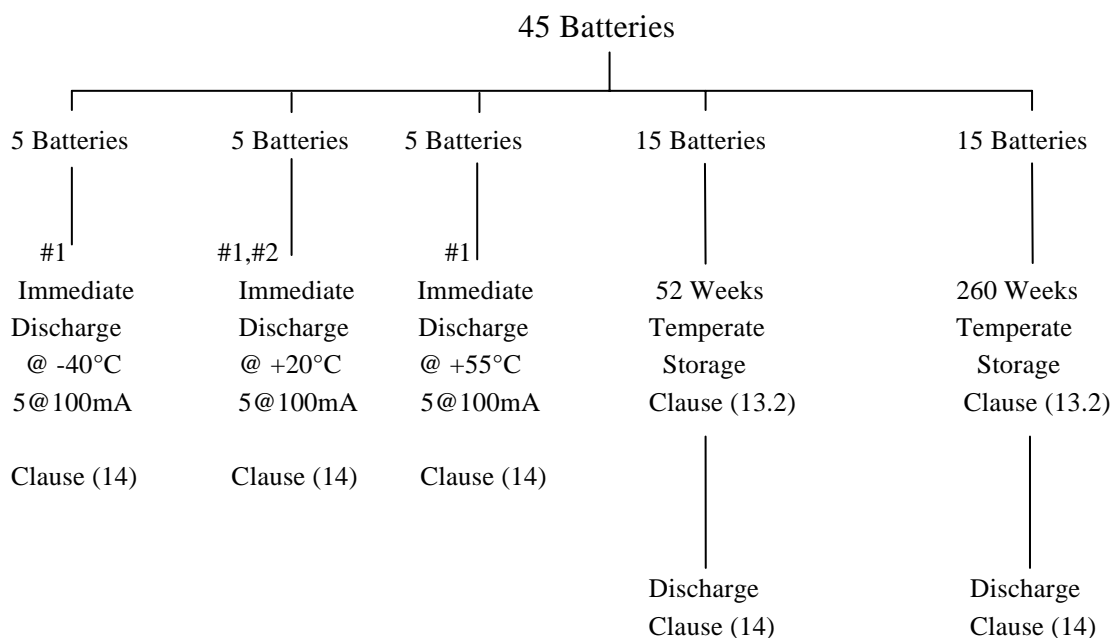
16.5 Performance Assessment Sheets (PAS)

To assist the acquirer during the tender assessment stages, a PAS is provided at annex A. The PAS augments the PCC and formal test report by summarising the technical compliance data and displaying the data in a common format.

Notes for PAS completion:

- * Delete as appropriate.
- The PAS should be printed on Company Headed/Logo paper.
- The PCC test schedule indicates the minimum number of samples/results required and the test sequence.
- Limitations of the design shall be described and any instances of Sample/Test equipment failures shall be fully reported. Any Deviations from the defined test procedures shall be disclosed.
- Performance data shall clearly indicate whether it originates from the certification exercise or production/release testing following contract award.
- Interim Certificates shall clearly indicate test “due dates” for Full Certification.

Fig 1 Product Conformity Test Schedule



Note #1 Indicates the tests to be carried out for interim certification (see clause **16.2**).

#2 Indicates the tests to be carried out for periodic verification (see clause **16.4**).

17 HAZARD CLASSIFICATION AND TRANSPORTATION REQUIREMENTS

For transportation considerations, lithium cells and batteries are designated as UN 3090 and may be either classified as Class 9 Dangerous Goods or are exempt, in either case compliance with various constructional and safety test requirements are mandatory within a range of transport regulations.

Within the Declaration of Conformity, the manufacturer shall state:

1. The UN hazard Classification (i.e. either Class 9 Dangerous Goods or Exempt from Class 9)
2. Compliance with the range of UK National and Multi-National mode specific transport regulations stipulated in Def Stan 61-21.
3. The maximum lithium contents of an individual cell and battery (expressed in grams).
4. Reference to a test report demonstrating compliance to UK National and Multi-National mode specific transport regulations stipulated in Def Stan 61-21. The report shall also indicate the date of assessment.
5. Reference to the manufacturing data package (build standard) for materials, piece parts and processes used in the battery construction.
6. Safety devices incorporated at cell and battery level shall be defined (these include: vents, fuses, diodes and positive temperature coefficient resistors etc).

SECTION 6 MARKING REQUIREMENTS

18 GENERAL REQUIREMENTS

Product shall be marked in accordance with clause 12 of this supplement.

SECTION 7 CELL AGE

19 GENERAL REQUIREMENTS

The cell age (at the time of delivery) shall be less than 12 months.

SECTION 8 PACKAGING AND LABELLING REQUIREMENTS

20 GENERAL REQUIREMENTS

In addition to the packaging and labelling requirements stated in the contract, all packaging and labelling shall comply with the requirements of the civil dangerous goods transport regulations governing land, sea and air modes of transport. Except where specified in the contract or excluded within the regulations this shall include packaging requirements for mixed passenger and cargo aircraft.

All levels of packaging shall also include:

1. The product NATO Stock Number.
2. The date of manufacture.
3. The battery storage life in the format “NOT TO BE STORED BEYOND *MM,YY*” which shall be 5 years from the date of manufacture.

Annex A

Performance Assessment Sheet In Accordance with:

Def.Stan. 61-21/Issue 3 dated 20/03/2009
General Specification for Batteries

Def.Stan. 61-21 Supplement 065/Issue 2 dated 14/08/2009
Lithium Thionyl Chloride Battery 3.6V
NSN 6135-01-435-5558

Status Batch/Interim/Full*

Contract Ref:

Certificate Nos:

Supplier	Product Type & Data
Name:	Manufacturer: Place of Manufacture: Battery Type:
Address & Tel:	Battery Manufacturing Data Pack/Build Standard Ref: Issue: Date
ISO 9000 Status Accreditation Body: Certificate Ref:	Cell Manufacturing Data Pack/Build Standard Ref: Issue: Date
Quality Plan Ref: Issue: Date:	Test Report(s) Ref(s): Date(s):
Test Laboratory (if applicable) Name: Address	Cell Transport Certificate Ref: Date:
Additional Information, Limitations, Test Deviations:	

Interim Certification								
Supp Ref	Attribute	Test Rep Ref & Date	Criteria	Result(s)/Comments				
8	System		Safety devices, Construction and Capability					
10	Dimensions		BSEN60086-2 ER14 Length 50.4mm Max Dia 26.0mm Max Flat Negative					
11	Mass 48g		Range & Mean (g)					
7	Off Load V		BSEN60086-1 System E					
12	Marking		BSEN60086-1 System E					
14	Immed. Capacity @ 100mA		>1.0 Ah @ -40°C					
			>3.3 Ah @ +20°C					
			>4.2 Ah @ +55°C					
Full Certification								
14	52 Weeks Capacity @ 100mA		>0.95 Ah @ -40°C					
			>3.2 Ah @ +20°C					
			>4.1 Ah @ +55°C					
14	260 Weeks Capacity @ 100mA		>0.85 Ah @ -40°C					
			>2.8 Ah @ +20°C					
			>3.75 Ah @ +55°C					
15.1	Post Storage Examination		Observation					
<p>With the exception of any Limitations/Test deviations (described above) the product () conforms to the specification requirements.</p> <p>The supporting data, calculations and performance test reports are a true and accurate record.</p> <p>Signatory(s) and Dates):</p> <p>Position/Function:</p>								

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Kentigern House

65 Brown Street

GLASGOW G2 8EX

DStan Helpdesk

Tel 0141 224 2531/2

Fax 0141 224 2503

Internet e-mail enquiries@dstan.mod.uk

File Reference

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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 an 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 can be found on the DStan Website www.dstan.mod.uk, updated weekly 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 UK Defence Standardization (DStan) without delay in order that the matter may be investigated and appropriate action taken.