



IECEX TEST REPORT COVER



ExTR Reference Number : **FR/INE/ExTR23.0020/00**
 ExTR Free Reference Number : **RC-038240**
 Compiled by + signature (ExTL) : **A. GRIMIEAU**
 Reviewed by + signature (ExTL) : **O. COTTIN**
 Approved by + signature (ExCB) ... : **Thierry HOUEIX**
 Date of issue : **2023-04-25**



Ex Testing Laboratory (ExTL)..... : **INERIS**
 Address : **Parc TECHNOLOGIQUE ALATA - BP n°2 - F-60550 VERNEUIL-en-HALATTE**

Ex Certification Body (ExCB)..... : **INERIS**
 Address : **Parc TECHNOLOGIQUE ALATA - BP n°2 - F-60550 VERNEUIL-en-HALATTE**

Applicant's name..... : **SAFT**
 Address : **Rue Georges Leclanché- BP1039 86060 POITIERS (FRANCE)**

Standards associated with this ExTR package and their related Amendments, Corrigenda or ISHs : **IEC 60079-11:2011 6th ed.**


Clauses considered : All clauses considered
 Only specific clauses considered

Test procedure..... : **IECEX System**
 Test Report Form Number : **IM1391AK based on ExTR Cover_10 (released 2022-10-17)**

Test item description..... : **Primary Li-SOCl₂ cell**
 Model/type reference : **LS 26500plus**
 Code (e.g. Ex _ II_ T_) : **N/A**
 Rating..... : **N/A**

ExTR Package Contents(Assembled ExTR documents and Additional reference material)

IECEX Test Report Cover	RC-038240
IECEX Test Report of Partial Testing IEC 60079-11:2011 6th ed.	PT-60079-11-038240

Manufacturer's name	SAFT		
Address	Rue Georges Leclanché- BP1039 86060 POITIERS (FRANCE)		
Trademark.....			
Certificate No (optional)	N/A		
QAR Reference N°(optional)	N/A		
Particulars: Test item vs. Test requirements			
Classification of installation and use	N/A		
Ingress protection	N/A		
Rated ambient temperature range (°C)	-60°C to +85°C		
Rated service temperature range (°C) for Ex Components.....	N/A		
General remarks:			
The test results presented in this ExTR package relate only to the item or product tested.			
<ul style="list-style-type: none"> ▪ "(See Attachment #)" refers to additional information appended to the ExTR package. ▪ "(See appended table)" refers to a table appended to the ExTR package. ▪ Throughout this ExTR package, a point is used as the decimal separator. ▪ <i>Where the term "N/A" appears in any part of an ExTR package, it indicates that the associated issue was considered "Not applicable" to the involved evaluation.</i> ▪ <i>In accordance with IECEx 02, a Receiving ExCB may request a sample of the Ex equipment and copies of the documentation referred to in an ExTR Cover.</i> 			
The technical content of this ExTR package shall not be reproduced except in full without the written approval of the Issuing ExCB and ExTL.			
Use of uncertainty of measurement for decisions on conformity (Decision rule):			
No decision rule is specified by the standards associated with this ExTR package, when comparing the measurement result with the applicable limit according to the specification in these standards. The decisions on conformity are made without applying the measurement uncertainty as described in IECEx OD 012 (i.e. "simple acceptance" decision rule, previously known as "accuracy method").			
General product information:			
NOMENCLATURE OF ENCLOSURE/EQUIPMENT			
Number	Name	Materials	Observations
N/A			
The LS 26500plus Lithium-thionyl chloride (Li-SOCl ₂) cell is a primary cell. Its nominal voltage is 3.6 V and its rated capacity is 8.5 Ah.			
Refer to the datasheet SAFT LS 26500plus Datasheet N° 31207-2-1021 for more information.			
Details of change (applicable only when revising an existing ExTR package):			
N/A			
Copy of Marking Plate:			
N/A			
Details regarding 'trade agent' / 'local assembler' application in accordance with OD 203:			
N/A			

<p>In accordance with OD 024, testing not fully performed by ExTL staff at the above ExTL address:</p> <p><input checked="" type="checkbox"/> N/A</p> <p><input type="checkbox"/> in conformity with OD 024, see below the tests listing.</p>
<p>National differences considered as part of this evaluation:</p> <p><input checked="" type="checkbox"/> N/A</p> <p><input type="checkbox"/> TEST REPORT of NATIONAL DIFFERENCES</p>
<p>“Specific Conditions of Use” or “Schedule of Limitations”:</p> <p>The primary cell LS 26500<i>plus</i> is intended to be used in an ambient temperature range from -60°C to +40°C for ATEX purpose.</p>
<p>Routine tests, if any:</p> <p>N/A</p>
<p>Date(s) of performance for all testing:</p> <p><input type="checkbox"/> N/A</p> <p><input checked="" type="checkbox"/> see below the tests listing.</p>
<p>Assessment summary:</p> <p>This report deals with 3mOhms short-circuit test of this cell according to IEC 60079-11:2011 cl10.5.</p>
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TESTS LISTING

INERIS tests issuing from <u>this current file</u>					
Cofrac	EQUIPMENT	Test date	Test number	Observations	Verdict
*	23AA458-1 to 10	2023-02-06	MO0038 ATEX 23/0057	Cells and batteries short-circuit test according to IEC 60079-11:2011, cl 10.5. Maximal ambient temperature: +40°C	Pass

* tests covered by INERIS ISO17025 Cofrac accreditation, see on the test sheet.

INERIS tests issuing from the file : 0xxxx				
Cofrac	EQUIPMENT	Test number	Observations	Verdict
N/A				

* tests covered by INERIS ISO17025 Cofrac accreditation, see report of file : 0xxxx.

OD24 Witnessed tests by INERIS					Verdict
Reference Agreement		N/A	Date	N/A	
Reference Assessment		N/A	Date	N/A	
Reference OD24 tests					
EQUIPMENT	Test date	Test number	Type of witness(*)	Observations	Verdict
N/A					

(*) "onsite witness" or "remote" or "partial"

ISO17025 tests not performed by INERIS						
Subcontractor (*)	Accreditation number	EQUIPMENT	Test date	Test number	Observations	Verdict
N/A						

(*) For equipment in conformity with IECEx scheme, the subcontractor has to be an ExTL.

MANUFACTURER'S DOCUMENTS


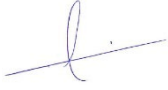
Manufacturer's Documents			
Title:	Drawing No.:	Rev. Level:	Date:
SAFT LS 26500plus Datasheet	31207-2-1021	-	October 2021

*Note: An * is included before the title of documents that are new or revised.*



IECEX TEST REPORT of PARTIAL TESTING



ExTR Reference Number	FR/INE/ExTR23.0020/00
ExTR Free Reference Number.....	PT-60079-11-038240
Compiled by + signature (ExTL).....	A. GRIMIEAU 
Reviewed by + signature (ExTL).....	O. COTTIN 
Date of issue.....	2023.04.21
Ex Testing Laboratory (ExTL)	INERIS
Address	Parc TECHNOLOGIQUE ALATA - BP n°2 - F-60550 VERNEUIL-en-HALATTE
Applicant's name	SAFT
Address	Rue Georges Leclanché- BP1039 86060 POITIERS
Country/Region.....	FRANCE
Standards	IEC 60079-11:2011 6 th ed.
Test Report Form Number	IM2166AA based on ExTR Partial Testing_2 (released 2018-02)
Related Amendments, Corrigenda or ISHs.....	N/A

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Possible test case verdicts:

- test case does not apply to the test item.....:N / A
- test item does meet the requirement:Pass

General remarks:

The test results presented in this ExTR of Partial Testing relate only to the item or product tested, and do not represent a complete evaluation and testing of the item or product.

- "(see Attachment #)" refers to additional information appended to this document.
- "(see appended table)" refers to a table appended to this document.
- Throughout this document, a point is used as the decimal separator.

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IEC 60079-11			
Clause	Requirement – Test	Result – Remark	Verdict
10	TYPE VERIFICATIONS AND TYPE TESTS		
10.5	Tests for cells and batteries		
10.5.1	General	<p>The cells was tested at a maximum ambient temperature of +40°C.</p> <p>The total resistance of the test bench was measured at 2.74 mΩ.</p> <p>⇒ It is compliant with the maximum resistance of 3 mΩ.</p> <p>(Refer to Measurement Section for details)</p>	Pass
10.5.2	Electrolyte leakage test for cells and batteries	<p>Ten samples of cells was short-circuited until discharged, and then placed on a blotting paper for 24 hours.</p> <p>⇒ Neither venting nor electrolyte leakage was encountered during the short-circuit tests and the following 24 hours</p> <p>(Refer to Measurement Section for details)</p>	Pass
10.5.3	Spark ignition and surface temperature of cells and batteries	<p>Spark ignition:</p> <p>The maximum short-circuit current was measured at 4.85 A.</p> <p>⇒ The spark ignition risk shall be verified during the assessment of the intrinsic safety apparatus in which the cell will be used.</p> <p>Surface temperature</p> <p>The maximum surface temperature of the cell was measured at 107.1 °C. It may be compatible with a temperature classification T4 for an ambient temperature of +40°C.</p> <p>⇒ The temperature classification shall be verified during the assessment of the intrinsic safety apparatus in which the cell will be used.</p> <p>(Refer to Measurement Section for details)</p>	Pass
10.5.4	Battery container pressure tests	Test not performed	N/A

Measurement Section, including Additional Narrative Remarks (as deemed applicable)

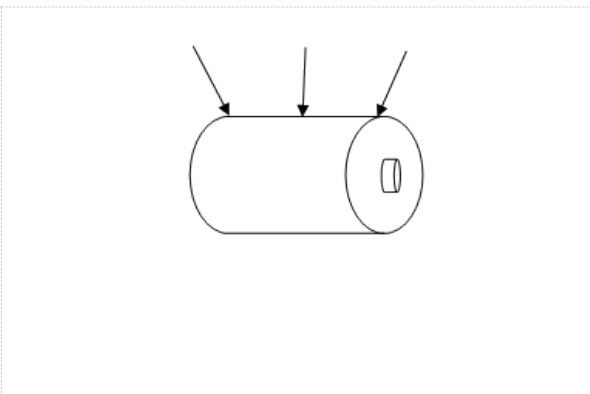
1- General information

INERIS test reference	MO0038 ATEX 23/0057
Manufacturer	SAFT
Type	LS 26500plus
Capacity specified by the manufacturer	Typical: 8.5 A.h
Technology	Primary Li-SOCl ₂ cell
Operating temperature (manufacturer specification)	-60°C to +85°C

2- Testing equipment used

Select	Equipment	Reference	Expiration date
<input checked="" type="checkbox"/>	Voltage and current logging unit	M-DM-1136	08/2023
<input checked="" type="checkbox"/>	Temperature logging unit	M-DM-1214	03/2024
<input checked="" type="checkbox"/>	Shunt	M-DM-0707	02/2023
<input checked="" type="checkbox"/>	Climatic chamber	M-AB-5183	Indicator
<input checked="" type="checkbox"/>	Battery cycler	N/A	N/A
<input checked="" type="checkbox"/>	Milliohm meter	M-DM-1294	12/2023
<input checked="" type="checkbox"/>	Thermocouples K type	M-DM-1375-1377-1379-1380	06/2023

Pictures of samples before testing



3- Charge/discharge cycles

N/A

4- Experimental data

The tests started from 2023/02/06

Reference of the equipment tested: 23AA458-1 to 10

Sample n°	Open-circuit voltage (V)	Ambient temp. (°C)	Short-circuit current (A)	Maximum cell temp. (°C)	Temperature rise (K)	Observed effect on each cell *
1	3,68	19,2	4,79	83,4	64,2	None
2	3,68	20,8	4,60	85,2	64,4	None
3	3,68	20,2	3,90	87,4	67,2	None
4	3,68	19,7	3,91	87,5	67,8	None
5	3,67	32,6	4,19	95,4	62,8	None
6	3,68	34,3	4,31	96,4	62,1	None
7	3,68	41,2	4,80	107,1	65,9	None
8	3,68	41,2	4,85	106,5	65,3	None
9	3,68	40,7	4,74	105,9	65,2	None
10	3,68	40,8	4,57	104,7	63,9	None

*(A) Electrolyte leakage (B) Venting (C) No change

Worst case regarding all the equipment:

	Open-circuit voltage (V)	Ambient temp. (°C)	Short-circuit current (A)	Maximum cell temp. (°C)	Temperature rise (K)	Observed effect on each cell *
WORST CASE	3.68	41.2	4.85	107.1	67.8	None

*(A) Electrolyte leakage (B) Venting (C) No change

The resistance of the testbench was measured at 2.74 mΩ or below.
Electrolyte leakage or venting was monitored during the test and the following 24 hours after the test.