International Civil Aviation Organization

DGP-WG/08-WP/35
10/10/08

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)
MEETING OF THE WORKING GROUP OF THE WHOLE

The Hague, 3 to 7 November 2008

Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011/2012 Edition

CASH BOXES TRANSPORTED BY AIRCRAFT

(Presented by Bjornar Davidsen, CAA-Norway)

SUMMARY

The aviation industry relies on IATA Dangerous Goods Regulations (IATA DG Regulations) to be in compliance with the Technical Instructions. IATA DG Regulations, 49th Edition states that using security type equipment such as attaché cases, cash boxes etc. on board an aircraft is totally forbidden (Entry 2.3.1.1, page 11).

ICAO may wish to clarify if the text in the Technical Instructions should be interpreted as a total ban on the use of security type equipment as mentioned above. If this is the case, ICAO may wish to consider permitting certain types of cash boxes. ICAO could also, through the Technical Instructions, maintain a list of approved cash-boxes, provided that a total ban is lifted. New procedures for granting approval may be required and should include a demonstrated ability of the box to contain any intentional or unintentional release of ink and any possible abnormal situation like a fire involving lithium batteries.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 Following a number of criminal attacks on Scandinavian cash consignments, Norway initiated in 2007 work to analyse how to reduce the risk of criminal attacks when transporting cash on board an aircraft. Such attacks could in turn lead to passengers or ground staff at the airport being injured or even killed. This would probably lead to distrust in the airport where the attack took place, affecting passenger flow and revenue.

1.2 One of the main conclusions of the working group examining the issue is that the risk of criminal attacks would be significantly reduced by using cash boxes. It follows that the risk of collateral damage also will be reduced.

1.3 The cash boxes normally use ink to stain the money, thus making it less attractive for criminals to carry out attacks. Cash boxes are constructed in such a way that it is very difficult to open the box unauthorized, without severely damaging the contents.

1.4 The cash boxes in some cases contain pyrotechnical devices (Q Case 380/400 as an example), others do not (iBox Zero from http://www.spinnaker.co.uk/), to spread the ink that dyes the money.[1]

1.5 Even if cash boxes do contain a small amount of dangerous goods, they seem to be allowed on board a passenger aircraft according to the Technical Instructions, Table 2.2, where Classification code 1.4S may apply if pyrotechnical equipment is involved and Packing Instructions 903/918 may apply if lithium batteries are involved. The ink that stains the money could also be in compliance with the Technical Instructions. The main issue for the aviation industry, however, seems to be that the IATA DG Regulations, 49th Edition, clearly specifies the following: *Security-type equipment such as attaché cases, cash boxes, cash bags, etc. incorporating dangerous goods, such as lithium batteries and/or pyrotechnical material, are totally forbidden* (page 11, Entry 2.3.1.1). IATA Dangerous Goods regulations shall, however, be in line with the Technical Instructions.

1.6 ICAO may wish to consider if the Technical Instructions should call for a total ban on the use of cash boxes or if certain cash boxes should be permitted. The IATA policy seems, as mentioned above, to rule out any use of cash boxes on board a passenger aircraft.

1.7 The appropriate authorities in the different States could possibly permit the use of cash boxes of certain kinds on a case by case basis. However, it would be an unfortunate situation if a cash box is allowed out of the State, but not back again, due to ground handling procedures based on IATA Dangerous Goods Regulations. An international approach through ICAO would be preferable.

1.8 **Clarification needed**

1.8.1 ICAO may wish to clarify if the text in the Technical Instructions should be interpreted as a total ban on the use of cash boxes. The IATA Dangerous Goods Regulations, 49th Edition, Section 1, Entry 2.3.1.1 on page 11, clearly does not allow any use of cash boxes.

1.9 **Suggested approach**

1.9.1 A suggested approach towards solving the issue could be that ICAO through the Technical Instructions maintains a list of approved cash-boxes that may be used on board an aircraft.

1.9.2 New procedures for granting approval may be required and should include a demonstrated ability of the box to contain any intentional or unintentional release of ink and any possible abnormal situation like a fire involving lithium batteries.

[1] Please find attached an evaluation of Q-Case cash box and information on Spinnaker International and their cash box as examples.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to:

a) consider if acceptance of certain cash-boxes could be based on their contents of dangerous goods including the interaction of the substances involved and the packaging;

b) consider if alternative methods for granting approval could be based on a demonstrated ability of the box to contain any intentional or unintentional release of ink and any possible abnormal situation like a fire involving lithium batteries;

c) consider if the urgent matter of arranging for safe transport of cash can be furthered by changing the Technical Instructions so that it maintains a list of approved cash-boxes that may be used on board an aircraft; and

d) consider which steps should be taken to achieve the changes mentioned under subparagraph c) above.

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APPENDIX A

Doc No: MSDS002 - for [T] Ink Product - Issue: 0(

Material Safety Data Sheet (MSDS)

Ink Delivery System – Product Group - AIB

Publication	001	002	003					
Date	29/06/04	29/10/04	27/05/05					
C.I.No	3762	3960	4143					

Authorised by:

Doc No: MSDS002 - for [T] Ink Product - Issue: 0

1. Identification of the Substance/Preparation and Company

Product Name: All Ink delivery systems whose product reference starts **"AIB [using suppliers suffix T ink]"** for use with the iBox cash in transit security case, whose intended use is the protection of cash and other valuables in transit, and the staining of such cash and other valuables in the event of an attempt to steal them. References to "The Material" relates to the staining ink and/or the Carbon Dioxide used as a propellant within the ink delivery system. References to The Product relates to the whole assembly.

Company Name:

Spinnaker International Ltd.,
Spinnaker House,
Saltash Parkway,
Saltash,
Cornwall,
PL12 6LF
UK.
Tel +44 (0)1752 – 850300
Fax +44 (0)1752 – 850301

Contact Person:

Mr A R Searle, Director – Engineering.

2. Composition/Information on Ingredients

Substances presenting a health hazard within the meaning of dangerous substance directive 67/548/EEC.

NAME	EEC No /EINECS	Conc'	SYMBOL	R-PHRASES
N-methyl-2-pyrrolidone	606-021-00-7	>50%	XI	R36/38
1-dodecyl-2-pyrrolidone	613-099-00-6	1-5%	C N	R34 R43 R50/53
Acetylenic diol		1-5%	XI	R36 R52/53
Antraquinone Dye(s)		0,1-1%	XI N	R41 R50

Carbon Dioxide is contained within the product in cylinders as a liquid under its own vapour pressure which varies with temperature. It is non-toxic, non-flammable and heavier than air.

3. Hazards Identification of the Preparation

In relation to the Ink:

XI ..... IRRITANT
C ..... CORROSIVE
N ..... Dangerous for the Environment
R36/38 ... Irritating to eyes and skin
R43 ..... May cause sensitization by skin contact
R52/53 ... Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic Environment

In relation to the Carbon Dioxide:

Toxicity – Occupational Exposure Standard (OES) 5000vpm. Asphyxiant vapour.
Danger to life at 10-20%v/v in air. Danger to persons lying on the floor as the vapour is heavier than air.
Liquefied gas in container under vapour pressure of about 56bar (g).
Note: Carbon Dioxide cannot exist as a liquid at atmospheric pressure.
Large volume increase on phase change – one volume of liquid or solid will give about 500 or 900 volumes of gas respectively at ambient conditions.
Slightly corrosive in the presence of moisture.

4. First Aid Measures

General
In all cases of doubt, when symptoms persist, seek medical attention.
NEVER GIVE ANYTHING BY MOUTH TO AN UNCONCIOUS PERSON.

Inhalation
Remove to fresh air, keep patient warm and at rest. If unconscious, place in recovery position and seek medical advice.

Eye Contact
Irrigate copiously with clean, fresh water for at least 10 minutes, holding the eyelids apart and seek medical advice.

Skin Contact
In relation to the ink:
Remove contaminated clothing. Wash skin thoroughly with soap and water or use recognised skin cleanser. **DO NOT USE SOLVENTS OR THINNERS.**

In relation to the Carbon Dioixde:
Irrigate affected area with tepid water for five minutes. Apply a sterile dressing and treat as a thermal burn. Seek medical advice and ensure that the possibility of severe internal burns from exposure to very low temperature is clearly understood.

Ingestion
If accidentally swallowed, obtain immediate medical attention. Keep at rest.
DO NOT INDUCE VOMITING.

5. Fire-fighting Measures

Extinguishing media:

Recommended: Alcohol resistant foam, CO2, Powders, Water Spray.
Not to be used: Waterjet.

Recommendations: Fire may produce dense smoke. Exposure to decomposition products may cause a health hazard. Appropriate breathing apparatus may be required. Cool closed containers exposed to fire with water from a safe distance. Inform emergency services of the nature of the product (CO_2 cylinders) and the possibility of rupture. Note: the cylinders are fitted with a burst cap which will rupture and allow contents to completely discharge if heat causes the Carbon Dioxide pressure to exceed the maximum permissible service level, should this occur this will lead to activation of the complete dye delivery system which may result in ink spraying.

Do not allow run-off from fire-fighting to enter drains or watercourses.

6. Accidental Release Measures

Personal related precautionary measures: Exclude sources of ignition and ventilate the area. Avoid breathing vapours or mists. See the protection measures mentioned in sections 7 & 8.

Spillage Control: Contain and collect spillage with non-combustible absorbent materials (e.g. sand, earth, vermiculite etc) and place in container for disposal according to local regulations (see section 13). Do not allow to enter drains or watercourses. Clean preferably with a detergent; avoid use of solvent. More detailed advice can be found in Spinnaker International Ltd's document: - Process Control Sheet 166.

Environmental Protection: If the product contaminates lakes, rivers or sewage's, inform appropriate authorities in accordance with local regulations.

7. Handling & Storage

Handling: before any handling, see sections 3 – 8 & 11

There are no user activities that involve handling of The Material other than clear up after release of the ink. Under these circumstances the user should follow the specific instructions on clean up routines detailed in Spinnaker International Ltd's document: - Process Control Sheet 166.

More general precautions are as follows:

Avoid skin and eye contact. Avoid inhalation of vapours or mists.

Smoking, eating and drinking should be prohibited in any ink spillage area. For personal protection see section 8.

Comply with Health and Safety at work laws.

Storage:

The product should be stored below 45°C. Store away from sources of heat/ignition. Store away from frost in a dry well ventilated place.
NO SMOKING
Containers should Not be stored in conditions likely to encourage corrosion.

. Exposure Controls/Personal Protection

There are no user activities that involve handling of The Material other than clear up after release of the ink. Under these circumstances the user should follow the specific instructions on clean up routines detailed in Spinnaker International Ltd's document: - Process Control Sheet 166.

In particular provide adequate ventilation. Where reasonably practicable this should be achieved by use of local exhaust ventilation and good general extraction. If these are not sufficient to maintain concentrations of solvent vapour below the occupational exposure limits, suitable respiratory protection must be worn.

Exposure Limits

SUBSTANCES	VALUES
arbon Dioxide	OES 5000vpm
-methyl-2-pyrrolidone	VME 20PPM VLE 100 PPM MAK 19PPM

Personal Protection:

Respiratory Protection: When workers are facing concentrations above the exposure limits they must use appropriate certified respirators, except in the case of over exposure to CO_2 when workers should vacate the area immediately and seek medical assistance.

Hand Protection: ..... Wear appropriate protective gloves of Nitrile or similar material for short-term protection. Chemical protection gloves are suitable, which are tested according to EN374. Barrier creams may help to protect the exposed areas of the skin, they should not be applied once exposure has occurred.

Eye Protection: ..... When workers are faced with the possibility of splashing of the ink they must use safety eyewear designed to protect against splash of liquids.

Other: ..... When workers are faced with the possibility of other contact with The Material, they must wear appropriate work clothing.

9. Physical and Chemical Properties

In relation to the ink

Physical state	Liquid
Colour	Violet
Odour	Mild
Solubility in water	Miscible
Solubility in other solvents	Not Determined
pH (Undiluted product)	Not Applicable
Apparent Density	1.1 G/CM3
Viscosity (at 25.0°C)	15 S.DIN4
Initial distillation temperature	202.0°C
Flash point	93.0°C
Auto-ignition temperature	>200°C
Melting point	Not applicable
Lower explosion limit	1.3%
Upper explosion limit	9.5%

In relation to the CO_2

Form	Liquefied pressure gas, colourless, odourless, non flammable
Molecular weight	44.01
Vapour Pressure (15°C)	50.85 bar
Density of gas (15°C, 1bar)	1.8474g/l
Specific gravity, gas (air=1)	1.528
Critical temperature	31.1°C
Critical pressure	73.825bar
Triple point (5.185 bar)	-56.6°C
Solubility of gas in water (15°C, 1bar)	1.9786 g/l
Note All pressures are absolute	

10. Stability and Reactivity

Stable under recommended storage and handling conditions (see section 7). In case of fire may produce hazardous decomposition products such as Carbon Monoxide and Dioxide, smoke, oxides of Nitrogen.

11. Toxicological Information

In relation to the ink:

There are no data available on the preparation itself.

Exposure to component solvents vapours concentration in excess of the stated occupational exposure limit may result in adverse health effects such as mucous membrane and respiratory system irritation and adverse effects on Kidney, Liver and Central Nervous System. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases loss of consciousness.
Repeated or prolonged contact with the material may cause removal of natural fat from the skin resulting in non-allergic contact dermatitis and absorption through the skin.
Liquid splashed in the eyes may cause irritation and reversible damage.

In relation to Carbon Dioxide:

Carbon Dioxide (which is normally present in atmospheric air at the level of approximately 350vpm (0.035%), regulates breathing function and an increase in concentration will cause increased breathing rates. The occupational exposure standard (OES) is 5000vpm (0.5%), but changes in the breathing rate may not be noticed until there is a concentration of 20,000vpm (2%) when the rate will increase to about 50% above the normal level. Prolonged exposure at this level for several hours may cause a headache and a feeling of exhaustion.
At high concentrations carbon dioxide may cause asphyxiation and can paralyse the respiratory centre. Breathing an atmosphere rich in carbon dioxide can cause immediate loss of consciousness and rapid death. Symptoms of asphyxiation may include rapid and gasping respiration, rapid fatigue, nausea, vomiting, cyanosis and may lead to loss of consciousness or death from anoxia.

For other eventual risks see Section 2 & 15

12. Ecological Information

There are no data available on the ink itself.

The chromate layer which protects the zinc-plating of the CO_2 cylinders, contains chromium in the oxidation state of VI.

This material should not be allowed to enter drains or watercourses.

13. Disposal Considerations

Do not empty into drains or watercourses. Never dump at sea. Never dispose of a product that has not been activated. Inform waste disposal contractor of material to be disposed of, that CO_2 cylinders comprise zinc-plated and chrome stabilised steel.

Waste and emptied containers must be disposed of in accordance with local regulations, and according to **Directive 2000/532/EEC**. The ink wastes are classified as follows:

08 03 07	Aqueous sludges containing ink
08 03 08	Aqueous liquid waste containing ink
08 03 12*	Waste ink containing dangerous substances
08 03 13	Waste ink other than those mentioned in **08 03 12**
08 03 14*	Ink sludges containing dangerous substances
08 03 15	Ink sludges other than those mentioned in **08 03 14**
08 03 16*	Waste etching solutions
08 03 17*	Waste printing toner containing dangerous substances
08 03 18	Waste printing toner other than those mentioned in **08 03 17**
08 03 19*	Disperse oil
08 03 99	Waste not otherwise specified

Beware that Ink Wastes have to be considered as "Special Waste" and require a particular attention. Ink Wastes have to be eliminated by Authorised Companies. Intact Product may be returned to Spinnaker International Ltd. for disposal.

14. Transport Information.

The Product is subject to carriage of Dangerous Goods by Road regulations in the UK and the ADR (European road transport) regulation in the EU, and also the IMDG code in relation to the CO2 canisters.

Under normal circumstances shipment of multiple products will be exempt from the classification of notification requirements of these regulations.

The product is classified as a hazardous good under the IATA regulations by virtue of the CO2 canisters and does not qualify for exemption.

15. Regulatory Information

According to **Directive 1999/45/EEC**, the ink is regulated as follows:

Symbols: **XI** = Irritant **C** = Corrosive **N** = Dangerous for the Environment

Contains: 1-dodecyl-2-pyrrolidone;

R-Phrases:
- **R36/38** – Irritating to eyes and skin
- **R43** – May cause Sensitisation by Skin contact.
- **R52/53** – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic Environment

S-Phrases:
- **S24** – Avoid contact with Skin.
- **S26** – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- **S37** – Wear suitable gloves.
- **S51** – Use only in well-ventilated areas.

Further amendments and adaptations to technical progress include:

SWITZERLAND (according to Special List G): Toxicity class: 4 OFSP No: 619004
Volatile organic compounds according to Swiss Decree (OCOV):92.8%
Volatile organic compounds 9according to 1999/13/EC): 92.8%

16. Other Information

Full Text of R-Phrases appearing in section 2: (Risk Phrases associated with constituents of The Material)

- **R36/38** Irritating to eyes and skin.
- **R34** Causes Burns.
- **R43** May cause Sensitisation by Skin contact.
- **R50/53** Very toxic to aquatic organisms, may cause long term adverse effects in the Aquatic environment.
- **R36** Irritating to eyes.
- **R52/53** Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic Environment
- **R41** Risk of serious damage to eyes.
- **R50** Very toxic to aquatic organisms

Under normal circumstances the user should not come into contact with The Material. Contact would normally only occur after an activation of the system. Under these circumstances user should follow guidance given in the clean up routines detailed in Spinnaker International Ltd's document: - Process Control Sheet 166.

The information contained in this MSDS is based on the present state of our knowledge, information provided by our suppliers and on current EEC and national laws. The product is not to be used for other purposes than those specified under section 1. The information in this MSDS is meant as a description of the safety requirements of our product and is issued pursuant to the Directive 91/155/EEC, it is not to be taken as a guarantee of the products properties.

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APPENDIX B

OPS-utvalget

De skandinaviska luftfartsmyndigheternas samarbetsorgan för flygsäkerhetsfrågor

STK DET SKANDINAVISKE TILSYNSKONTOR
DENMARK NORWAY SWEDEN

01 OKT 2007 09-27 ~~2007-03-14~~

STK 2006-310d-1031

Bo Eckerbert
Luftfartsstyrelsen
Norrköping

Kopia:
Per Veinberg
Gudmund Taraldsen — LT Norge

Godkännande av säkerhetsväskor Q-case 380 för transport av pengar.
Bifogat finner ni informationer som skall besvara de frågor ni ställt.

Med vänliga hälsningar
Karl-Erik Mårtensson
Karl-Erik Mårtensson
STK-OPS

STK - Det Skandinaviske Tilsynskontor
Luftfartsstyrelsen
SE-601 73 NORRKÖPING
Visiting address: Bergkällavägen 32
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STK – Det Skandinaviske Tillsynskontor
Luftfartsstyrelsen
601 73 Norrköping

Attn: Karl-Erik Mårtensson

Skellefteå 4 september 2007

Yttrande över LS 2006-7394, LS yttrande om produkten Q-case 380 från företaget SQS är säker ur flygsäkerhetssynpunkt.

Bilagor

1. LSH_14 Technical data
2. LSH_20 Technical data
3. Saft LSH MSDS
4. Räddningsverkets tolkning av explosivvarudirektivet
5. 10158 RV Certificate excluded prod -eng Dnr 1312_4523_2006
6. QC07-017 Varuinfo Q- ink röd & svart.
7. Drawings Flightbox Q-case
8. QC03-305, Bonfire test C-400
9. Semko C-400 R6 Test Report 411213-1

Med detta yttrande vill vi ge klarhet i de frågeställningar som framkommit i refererat LS yttrande.

Typbeteckning "Q-case 380/400"

Vi vill förtydliga att aktuell beteckning av produkten är "**Q-case 400**". Skillnaden jämfört med tidigare Q-case 380 är mått på produkten för anpassning till förekommande sedelstorlekar.

SQS Security Qube System AB
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Org. no: 556076-2741
VAT: SE556076274101
E-mail: info@sqs-security.com
Internet: www.cashguard.se

Systemsäkerhetsanalys (ur luftvärdighetssynpunkt)

Produktens struktur

Produktens struktur består av 2 halvor, en bottendel och ett lock, sammanhållen på ena sida av ett gångjärn och på den andra sidan av ett lås. Inga tätningskomponenter finns mellan dessa halvor. Gastäthet råder inte mellan dessa halvor. Luftinneslutningen i Q-case kan snabbt utan tryckfall ventilera mellan inneslutningen och omgivningen. En dekompression av omgivande atmosfär kan därför ej leda till förändringar av dess struktur.

De delkomponenter i Q-case som är förslutna och kan vara föremål för påverkan vid tryckförändringar är dess lithiumbatterier och färgbehållarna.

Lithiumbatterier

Lithiumbatterierna är behandlade enligt ovan under "MSDS för Litiumbatterier".

Färgbehållare, påverkan av lufttryck

Q-case består av 2 st infärgningsenheter.
Vardera infärgningsenhet innehåller 2 st färgbehållare om 195 g färg.
Två stycken infärgningsenheter i en Q-case ger totalt max 800 gram färg per Q-case.
Färgbehållarna är av plastmaterial utformade till påsar och förslutna utan luftinnehåll.
Färgen består av färgsubstanser löst i fosfatestrar.
Dess kokpunkt vid omgivande tryck 1000 mbar (atmosfärstryck vid jordytan) är > 200 °C.
Kokpunkten vid 300 mbar (motsvarande 10 000 meter upp) är >150 °C och kan därmed inte utgöra risk att plastpåsarna exploderar på grund dekompression till dessa trycknivåer.

Färgens innehålldeklaration enligt bilaga 5, QC07-017 Varuinfo Q- ink röd & svart.

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MSDS, tekniska och kemiska aspekter

Litiumbatterier

I produkten kan ingå maximalt 2 st lithiumbatterier typ LSH14 + 1 st typ LSH 20.
Maximal vikt batterier: 2*51 g + 1*100 g = 202 gram.
Maximal vikt Lithium: 2*1,7 g + 1*4,0 g = 7,4 gram

Tekniska datablad och MSDS för ingående lithiumbatterier bifogas enligt bilaga 1, 2 och 3.

Pentyl

Q-case består av 2 st infärgningsenheter med 0,84 meter penyltråd i vardera infärgningsenhet, totalt 1,68 m / Q-case.

Penyltrådens data

Laddning	1,0 gram/meter
Ämne:	PETN
FN-klass	1.1D
FN-nummer	UN 0065

Klassificeringsfrågan

Huruvida Q-case har klassning 1.3G eller 1.4S bygger på missförstånd. Produkten Q-case har vid granskning av Räddningsverket, utifrån den ringa mängd pentyl som innesluts i Q-case struktur klassats som icke pyroteknisk artikel.
Ingående infärgningsenheter som inehåller pentylstubin är som lös komponent klassad till 1.3G. Denna märkning är underleverantören skyldig att utföra på infärgningsenheter och som är synlig på den ena av infärgningsenheterna även efter inmontering i Q-case.

Räddningsverkets tolkning av explosivvarudirektivet, enligt bilaga 4.
Räddningsverkets certifiering av SQS produkttyper som inkluderas, enligt bilaga 5.

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Eliminering av risker med ljud, läckage av färg, och radiostrålning vid flygtransport.

För att skydda produkten vid transport måste den alltid förpackas i ett emballage.
För flygtransport Q-case skall ett separat emballage tas fram.

Modellritning enligt bilaga 7, Drawings Flightbox Q-case.

Radiostrålning

"Flygemballaget" tillverkas med ytterhölje av aluminiumplåt. Utförandet skall dämpa utgående strålning av eventuellt aktiv GSM-sändare till tillåten nivå. Emballaget innehåller en elektromekanisk brytare som bryter sändarfunktioner i Q-case när den befinner sig i emballaget. Därmed erhålls dubbel skyddsfunktion mot störande radiostrålning.

Ljudnivå

"Flygemballaget" är inklätt i absorberande material som väl dämpar eventuell ljudpuls till godkänd nivå.

Läckage av färg

"Flygemballaget" är inklätt i absorberande material som binder upp eventuell utströmmande färg från Q-case.

Resultat av tester utförda

För test av farlighet när produkten utsätts för brand är test utförd enligt UN, sect 16.6 "Recommendation on the TRANSPORT OF DANGEROUS GOPODS", QC03-305, Bonfire test C-400. Protokoll enligt bilaga 8.

Test av EMC-egenskaper, med avseende på bl. a Störande utstrålning. 10176 Semko C-400 R6 Test Report 411213-1. Protokoll enligt bilaga 9.

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Med vänlig hälsning

Kjell Lindskog

SQS
Security Qube System

Title: TEST RAPPORT			Doc. No QC03-305	
Issued by Mikael Lindskog	Approved Mikael Lindskog	Sec. Level	Date 2003-01-27	
Distr.			Revision 1:1	Page 1 (3)

1 Allmänt

Testet är ett EXTERNAL BONFIRE TEST AV Q – Case 400. Testet är utfört enligt serie 6 type C "Recommendation on the TRANSPORT OF DANGEROUS GOODS, manual of tests and criteria UN, sect 16.6"

2 Test

2.1 Plats
Testerna är utförda på Skellefteå Räddningstjänst övningsområde Solbacken Skellefteå.

2.2 Datum för test

23 januari 2003

2.3 Närvarande

Mikael Lindskog	SQS
Johan Marklund	SQS
Ola Friström	FRIAB

2.4 Väderförhållanden
Vind 1-2 m/s temperatur - 7 ° C, klart till halvklart

2.5 Testmetod

2.5.1 Genomförande

Testen är utförd i enlighet med MTC, sect 16.6.1.2 och 16.6.1.3.
VTE placerat på ett nätgaller ovanför ett delat oljefat fyllt med diesel och bensin.
VTE aktiverad under provet.
Tre stycken skärmar 1200x2400 av träfiber uppsatta i en radie på 4000 mm från VTE.

2.5.2 Dokumentation

Hela testförloppet dokumenterades med videokamera. Bifogad videofilm visar hela händelseförloppet.

SQS
Security Qube System

Title:	Date	Page	Doc. No
TESTRAPPORT	2003-01-27	2 (3)	QC03-305

3 Förutsättningar

3.1 Test objekt

Objekt:	Q-Case 400 samordnad provning med Q-Case 500
Explosiva medel	Se ritning
Antal provobjekt	1 st, aktiverade för transport
VTE dimension	Se SMST

4 Resultat

4.1 Tidsangivelser samt händelseförlopp

Provningen startar	13:50
VTE detonerar	13:52
Varning linslucka öppen	13:53
Varning linslucka öppen slutar	13:56
Detonation batterier	14:03
Provet avbryts	14:20

4.1.1 Splitter
Inget splitter från VTE konstaterat runt provområdet.

4.1.2 Värmestrålning
Ingen värmestrålning konstaterad från VTE.

4.1.3 Test plats
Alla dela av VTE kvar på gallret utom ytter- och innerlock som landade mindre än 1 meter från gallret batteriet detonerade.

4.1.4 Skärmar
Skärmar okulärbesiktade före och efter provet, inga märken efter splitter.

4.2.5 Ljudtrycksnivå
Mindre ljudeffekt vid detonation av VTE samt vid detonation av litiumbatteri se bilagda ljudmätningsprotokoll Q-Case 400 / Q-Case 500.

SQS
Security Qube System

Title:	Date	Page	Doc. No
TESTRAPPORT	2003-01-27	3 (3)	QC03-305

Bilagor Video upptagning, Q-Case 400/Q-Case 500 "BONFIRE TEST"
Ljudmätningsprotokoll

Referenser: United nation, Recommendation on the Transport of Dangerous Goods, Manual of tests and Criterias, Third revised edition.

SKELLEFTEÅ, 27 januari 2003

Mikael Lindskog
Kvalitet & Miljöansvarig

Bilaga 7, Flightbox

RÄDDNINGS VERKET
Swedish Rescue Services Agency

Please contact
Arne Bogegård, +46 8 590 083 46
E-mail
arne.bogegard@srv.se
Project

1 (1)

Our date
2006-09-14
Your date

File No
1312-4523-2006
Your reference

TO WHOM IT MAY CONCERN

Certificate

In our capacity as competent authority for questions dealing with explosives in Sweden we hereby certify that below mentioned products produced by SQS Security Cube Systems AB, Sweden are excluded from the provisions of the Swedish Act (SFS 1988:868, 2 §) on Flammables and Explosives and the Ordinance (SFS 1988:1145, 8 § and 10 §) on Flammables and Explosives and are not covered by the regulations for the transport of hazardous goods in accordance with ADR Chapter 2.2 clause 2.2.1.1.1 remark (b).

Name of products
Q-Case 380
Q-Case 400
Q-Case 500
Q-case 380 NCR
Q-Collector 380
Q-Cut Electronic NCR
Q-Cut Electronic Delarue
Q-Cut Electronic WN

RÄDDNINGSVERKET

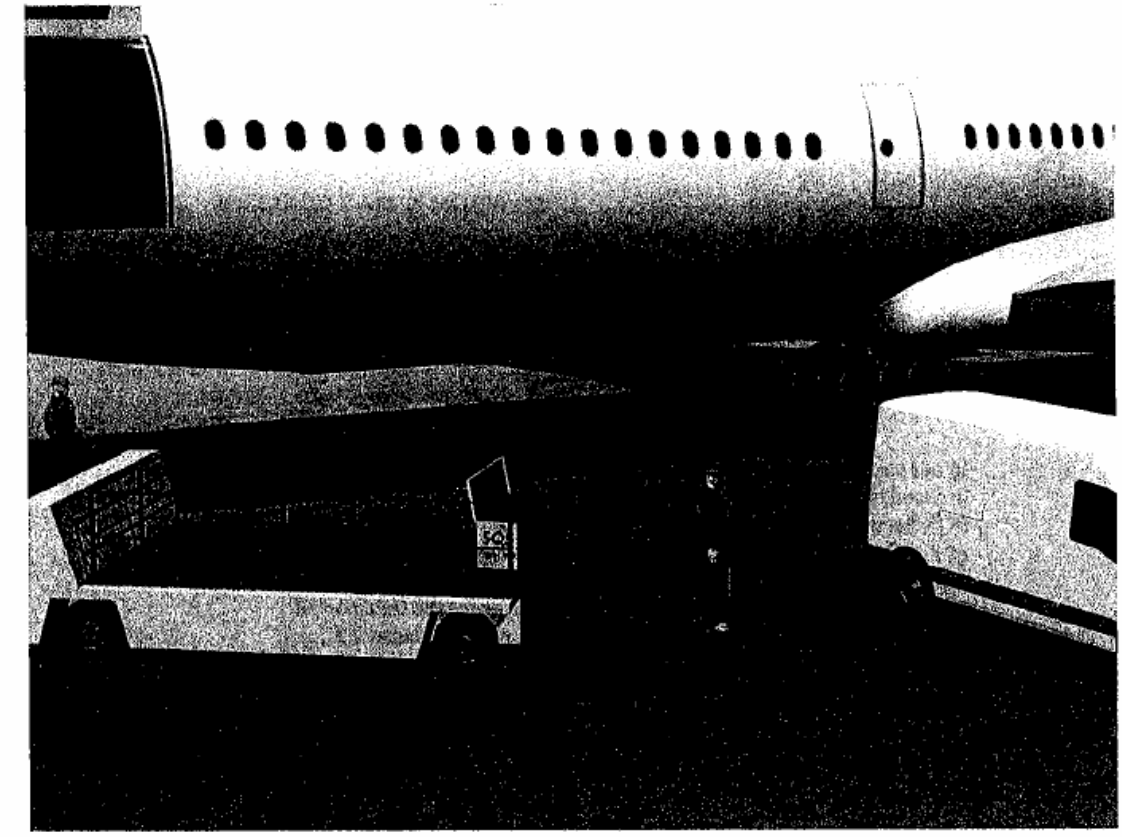
Kjell Bröbäck
Head of Sector

Swedish Rescue Services Agency
Address: Norra Klarag 18
S-651 80 Karlstad

Tel: +46 54 13 50 00
Fax: +46 54 13 56 00

E-mail: srv@srv.se
Internet: www.raddningsverket.se

VAT No 202100-3914



RÄDDNINGS VERKET
Swedish Rescue Services Agency

Please contact
Kjell Broback, +46 (0)8 5900 8357
E-mail
kjell.broback@srv.se
Project

Our date
2003-06-18
File No
13/624/02
Your date
2002-06-05
Your reference
M. Lindskog

SQS Sequrity Qube System AB
Box 715
931 27 Skellefteå

The Swedish Rescue Services Agency's Interpretation of the Council Directive 1993/15/EEG Concerning Safety Cases.

With reference to your letter from May 30, 2002 concerning how safety cases shall be assessed according to the directive 93/15/EEG from April 5, 1993, the Department for Flammables and Explosives (BEx) hereby wants to make the following statement.

The safety cases with their explosive substances are not to be seen as pyrotechnic articles.

The safety cases that the SQS successfully has tested according to the test 6c of the UN Manual of Test and Criteria have by BEx, based on the test as well as the small amount of explosives in the cases, been excepted from the regulations in the Flammables and Explosives Act.

At a meeting held in Brussels on November 11, 2002 with the standing committee for the Council Directive 93/15/EEG of 5 April 1993, on the harmonisation of the provisions relation to the placing on the market and supervision of explosives for civil uses, Sweden brought up the question how to assess these types of cases, i.e. if this type of product comes within the scope of the directive and thereby should be comprised by requirements of "assessment of correspondence" and CE marking.

The committee's chairman pointed out that these types of products that are not listed with a UN number in the Recommendations on the Transport of Dangerous Goods fall outside the scope of the directive.

Flammables and Explosives Department

Lars Synnerholm
Head of the Explosives Unit

Kjell Bröback
Principal Administrative Officer

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+46 (0)8 29 52 25

E-mail
bex@srv.se

Internet
www.srv.se

VAT No
202100-3914

Address
Vretenvägen 13

Material/Product Safety Data Sheet
(MSDS-PSDS)

LS/LSG/LSH/LST/LSX products	Lithium /Thionyl chloride single cells and multi-cell battery packs	Simplified Advice Code
Revision 6 Date 07/2006		G

1. Identification of the Substance or Preparation and Company

Product	Primary Lithium/Thionyl chloride unit cells and multi-cell battery packs ($Li–SOCl_2$)			
Production sites	Saft Ltd. River Drive Tyne & Wear South Shields NE33 2TR – UK Ph. :+44 191 456 1451 Fax :+44 191 456 6383	Saft Rue Georges Leclanché BP 1039 86060 Poitiers cedex 9 France Ph. :+33 (0)5 49 55 48 48 Fax :+33 (0)5 49 55 48 50	Saft America Inc 313 Crescent Street Valdese NC 28690 – USA Ph. :+1 (828) 874 4111 Fax :+1 (828) 874 2431	Saft Batteries Co., Ltd Zhuhai Free Trade Zone Lianfeng Road Zhuhai 519030 Guangdong Province China Ph. : +86 756 881 9318 Fax : +86 756 881 9328
Emergency contact Within the USA	+1 (703) 527 3887 +1 (800) 494 9300	(CHEMTREC US Service Center)		

2. Composition & Information on Ingredients

Each cell consists of an hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.

Ingredient	Content	CAS No.	CHIP Classification
Lithium (Li)	3.5-5%	7439-93-2	  **F**; R14/15 **C**; R34 R14/15, R21,R22, R35, R41, R43 S2, S8, S45
Thionyl chloride ($SOCl_2$)	40-46%	7719-09-7	   **C**; R14, R21, R22, R35, R37, R41,R42/43 S2, S8, S24, S26, S36, S37, S45
Aluminum chloride anhydrous ($AlCl_3$)	1-5%	7446-70-0	  R14, R22, R37, R41, R43. S2, S8, S22, S24, S26, S36, S45
Carbon (C_n)	3-4%	1333-86-4	NONE KNOWN
Amount varies depending on cell size			

7. Handling and Storage	
Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non conductive (i.e. plastic) trays.
Storage	Store in a cool (preferably below 30°C) and ventilated area, away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 100°C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.
Other	Lithium-Thionyl chloride batteries are not rechargeable and should not be tentatively charged. Follow Manufacturers recommendations regarding maximum recommended currents and operating temperature range. Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

8. Exposure Controls & Personal Protection					
Occupational exposure standard		Compound	8hr TWA	15min TWA	SK
		Sulfur dioxide	1 ppm	1 ppm	-
		Hydrogen chloride	1 ppm	5 ppm	-
	**Respiratory protection**	In all fire situations, use self-contained breathing apparatus.			
	**Hand protection**	In the event of leakage wear gloves.			
	**Eye protection**	Safety glasses are recommended during handling.			
	**Other**	In the event of leakage, wear chemical apron.			

14. Transport Information			
Label for conveyance	For the single cell batteries and multicell battery packs which are non-restricted to transport, use lithium batteries inside label. For the single cell batteries and multicell battery packs which are restricted to transport (assigned to the Miscellaneous Class 9), use Class 9 Miscellaneous Dangerous Goods and UN Identification Number labels. In all cases, refer to the product transport certificate issued by the Manufacturer.		
UN number	UN3090		
Shipping name	Lithium Batteries		
Hazard classification	Depending on their lithium metal content, some single cells and small multicell battery packs may be non- assigned to Class 9 (Refer to Transport Certificate)		
Packing group	II		
IMDG Code	9033		
CAS			
EmS No.	4.1-06		
Marine pollutant	No		
ADR Class	Class9		
15. Regulatory Information			
Risk phrases	Lithium (Li)	R14/15 R21 R22 R35 R41 R42/43	Reacts violently with water, liberating extremely flammable gases. Harmful in contact with skin. Harmful if swallowed. Causes burns. Risk of serious damage to eye. May cause sensitization by inhalation and skin contact.
	Thionyl chloride ($SOCl_2$)	R14 R22 R35 R37 R41 R42/43	Reacts with water. Harmful if swallowed. Causes burns. Irritating to respiratory system. Risk of serious damage to eye. May cause sensitization by inhalation and skin contact.
	Aluminum chloride anhydrous ($AlCl_3$)	R14 R22 R37 R41 R43	Reacts with water. Harmful if swallowed. Irritating to respiratory system. Risk of serious damage to eye. May cause sensitization by skin contact.
Safety phrases	Lithium (Li)	S2 S8 S45	Keep out of reach of children Keep away from moisture In case of incident, seek medical attention.
	Thionyl chloride ($SOCl_2$)	S2 S8 S24 S26 S36 S37 S45	Keep out of reach of children. Keep away from moisture. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water. Wear suitable protective clothing. Wear suitable gloves. In case of incident, seek medical attention.
	Aluminum chloride anhydrous ($AlCl_3$)	S2 S8 S22 S24 S26 S36	Keep out of reach of children. Keep away from moisture. Do not breathe dust. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water. Wear suitable protective clothing.
UK regulatory references	Classified under CHIP		

Primary lithium batteries
LSH 20

3.6V Primary lithium-thionyl chloride (Li-$SOCl_2$)
High power
D-size spiral cell

For high drain/high pulses applications requesting superior voltage response in - 60°C/+ 85°C environments.

Key features

- High and stable operating voltage
- Superior drain capability
- Low self-discharge rate *(less than 3% after 1 year of storage at + 20°C)*
- Stainless steel container
- Hermetic glass-to-metal sealing
- Built-in safety vent
- Finish with 5 A fuse
- Non-flammable electrolyte
- Underwriters Laboratories (UL) Component Recognition (File Number MH 12609)
- Restricted for transport (Class 9)

Main applications

- Radiocommunication and other military applications
- Alarms and security systems
- Beacons and emergency location transmitters
- GPS
- Metering systems
- Sonobuoys
- Tracking systems
- GSM communication

etc...

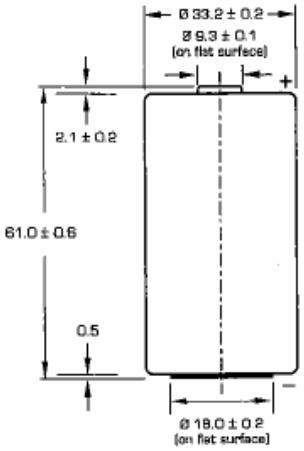
NATO stock number
6135 14 440 1213

Cell size references		**UM1 - R20 - D**
Electrical characteristics		
(typical values relative to cells stored for one year or less at + 30°C max.)		
Nominal capacity *(at 15 mA + 20°C 2.0V cut off. The capacity restored by the cell varies according to current drain, temperature and cut off).*		13.0 Ah
Open circuit voltage	(at + 20°C)	3.67V
Nominal voltage	(at 2 mA + 20°C)	3.6V
Pulse capability: Typically up to 4000 mA *(4000 mA/0.1 second pulses, drained every 2 mn at + 20°C from undischarged cells with 10 µA base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history. Fitting the cell with a capacitor may be recommended in severe conditions. Consult Saft)*		
Maximum recommended continuous current *(to maintain cell heating within safe limits)*		1800 mA
Storage	*(recommended)* *(for more severe conditions, consult Saft)*	+ 30°C (+ 86°F) max
Operating temperature range *(Operation above ambient T may lead to reduced capacity and lower voltage readings at the beginning of pulses. Operation with current continuously above 1 A may restrict upper T range. Consult Saft)*		- 60°C/+ 85°C (- 76°F/+ 185°F)
Physical characteristics		
Diameter *(max)*		33.4 mm (1.32 in)
Height *(max)*		61.6 mm (2.42 in)
Typical weight		100 g (3.5 oz)
Li metal content		approx. 4.0 g
Available termination suffix	CN, CNR CNA (AX) FL	radial tabs axial leads flying leads ...etc.

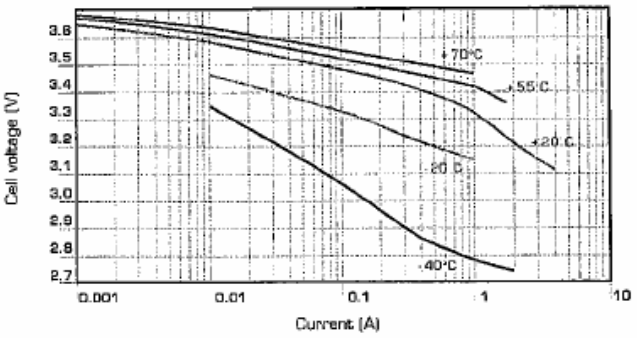
September 2004

SAFT

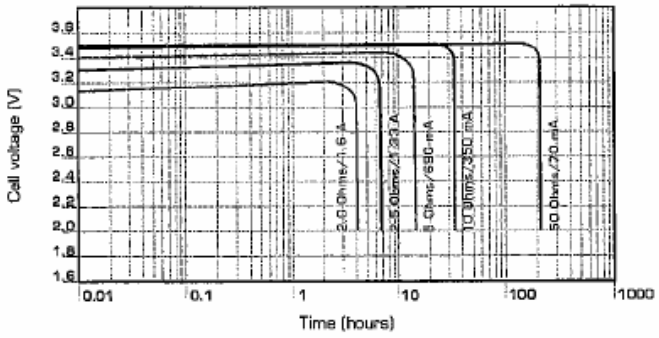
LSH 20



Dimensions in mm.



Voltage plateau versus Current and Temperature (at mid-discharge)



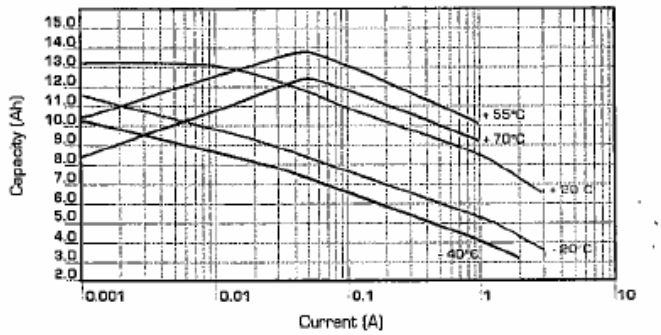
Typical discharge profiles at + 20°C

Storage

- The storage area should be clean, cool (not exceeding + 30°C), dry and ventilated.

Warning

- Fire, explosion and severe burn hazard.
- Do not recharge, short circuit, crush, disassemble, heat above 100°C (212°F), incinerate, or expose contents to water.
- Do not solder directly to the cell.



Restored Capacity versus Current and Temperature (2.0V cut off)

Saft
12, rue Sadi Carnot
93170 Bagnolet - France
Tel +33 1 49 93 19 18
Fax +33 1 49 93 19 69

www.saftbatteries.com

Doc. Nº 31015-2-0904
Published by the Communications Department

Primary lithium batteries
LSH 14

3.6V Primary lithium-thionyl chloride (Li-$SOCl_2$)
High power
C-size spiral cell

For high drain/high pulses applications requesting superior voltage response and operating life in - 60°C/+ 85°C environments.

Key features

- High and stable operating voltage
- Superior drain capability
- Low self-discharge rate *(less than 3% after 1 year of storage at + 20°C)*
- Stainless steel container
- Hermetic glass-to-metal sealing
- Built-in safety vent
- Finish with 5 A fuse
- Non-flammable electrolyte
- Underwriters Laboratories (UL) Component Recognition (File Number MH 12609)
- Restricted for transport (Class 9)

Main applications

- Radiocommunication and other military applications
- Alarms and security systems
- Beacons and emergency location transmitters
- GPS
- Metering systems
- Sonobuoys
- Micropipettes

etc...

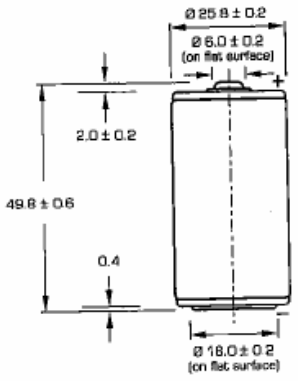
NATO stock number
6135 12 306 4125

Cell size references		**UM2 - R14 - C**
Electrical characteristics		
(typical values relative to cells stored for one year or less at + 30°C max.)		
Nominal capacity *(at 15 mA + 20°C 2.0V cut off. The capacity restored by the cell varies according to current drain, temperature and cut off).*		5.5 Ah
Open circuit voltage	(at + 20°C)	3.67V
Nominal voltage	(at 1mA + 20°C)	3.6V
Pulse capability: Typically up to 2000 mA *(2000 mA/0.1 second pulses, drained every 2 mn at + 20°C from undischarged cells with 10 µA base current, yield voltage readings above 3.0V. The readings may vary according to the pulse characteristics, the temperature, and the cell's previous history. Fitting the cell with a capacitor may be recommended in severe conditions. Consult Saft)*		
Maximum recommended continuous current *(to maintain cell heating within safe limits)*		1300 mA
Storage	*(recommended)* *(for more severe conditions, consult Saft)*	+ 30°C (+ 86°F) max
Operating temperature range *(Operation above ambient T may lead to reduced capacity and lower voltage readings at the beginning of pulses. Consult Saft)*		- 60°C/+ 85°C (- 76°F/+ 185°F)
Physical characteristics		
Diameter *(max)*		26.0 mm (1.02 in)
Height *(max)*		50.4 mm (1.98 in)
Typical weight		51 g (1.8 oz)
Li metal content		approx. 1.7 g
Available termination suffix		
	CN, CNR	radial tabs
	3PF, 3 PF RP	radial pins
	CNA (AX)	axial leads
	FL	flying leads ...etc.

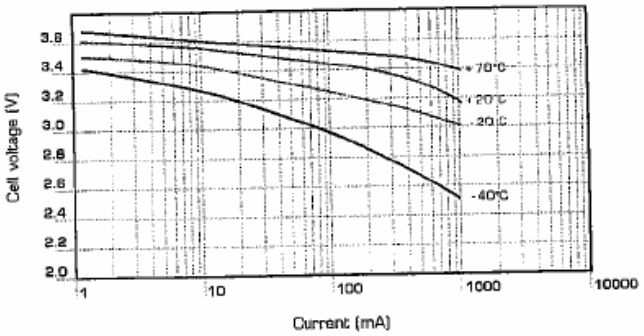
September 2004

saft

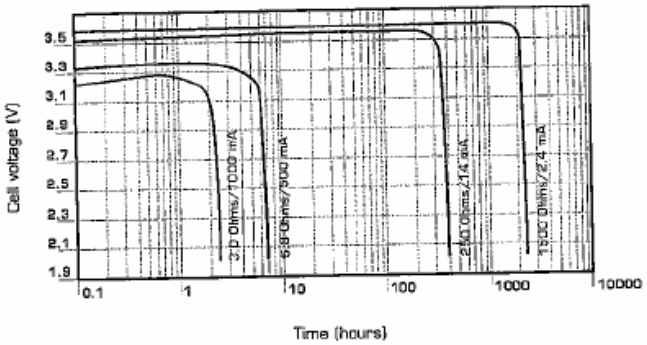
LSH 14



Dimensions in mm.



Voltage plateau versus Current and Temperature (at mid-discharge)



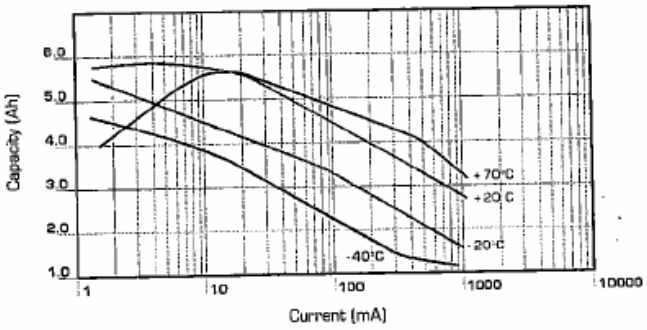
Typical discharge profiles at +20°C

Storage

- The storage area should be clean, cool (not exceeding +30°C), dry and ventilated.

Warning

- Fire, explosion and severe burn hazard.
- Do not recharge, short circuit, crush, disassemble, heat above 100°C (212°F), incinerate, or expose contents to water.
- Do not solder directly to the cell.



Restored Capacity versus Current and Temperature (2.0V cut off)

Saft
12, rue Sadi Carnot
93170 Bagnolet - France
Tel +33 1 49 93 19 18
Fax +33 1 49 93 19 69

www.saftbatteries.com

Doc. Nº 31013-2-0804
Published by the Communications Department

saft

EMC TEST REPORT

No.411213-1

Electromagnetic disturbances

EQUIPMENT UNDER TEST

Equipment :	Cash-In-Transit solution
Type / model :	Q-Case 400 rev.6
Manufacturer :	SQS Security Qube System AB
Tested by request of :	SQS Security Qube System AB

SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report the equipment complies with the requirements according to the following standards.

ETSI EN 301 489-1 V1.3.1
ETSI EN 301 489-7 V1.1.1

For detalils see section 4.

Date of issue: 26 October 2004

Tested by: Alicja Klepczynska

Approved by: Annika Szalkai

Intertek Semko AB
Torshamnsgatan 43, Box 1103, SE-164 22 Kista, Sweden
Telephone +46 8 750 00 00, Fax +46 8 750 60 30, www.sweden.intertek-etlsemko.com
Registered in Sweden: No SE556024059901, Registered office: As address

CONTENTS

1. CLIENT INFORMATION

The EUT has been tested by request of

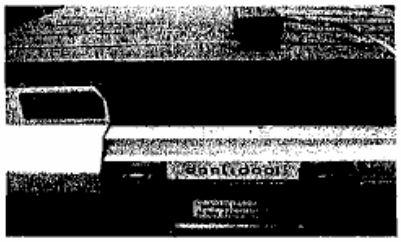
Company:	SQS Security Qube System AB Maskinvägen 13 931 27 Skellefteå Sverige
Name of contact:	Mikael Lindskog

2. EQUIPMENT UNDER TEST (EUT)

2.1 Identification of the EUT

Equipment:	Cash-In-Transit solution
Type/Model:	Q-Case 400 rev.6
Brand name:	SQS Security Qube System
Manufacturer:	SQS Security Qube System AB
Rating:	---
Class:	---

Identification photo referring to the type:



2.2 Additional information about the EUT

The EUT was tested in a floor table top configuration. The imbedded GSM module was active.

2.3 Peripheral equipment

No peripheral equipment was needed for correct operation of the EUT during test.
Prior to the test the EUT was locked and activated via a call to the imbedded Minicall module.
The GSM-network was not present during the radiated emission and radiated immunity tests.
Deactivating and unlocking was carried out with the blue electronic code-key.

2.4 Modifications made to improve EMC:

No modifications were required to obtain the results presented in this report.

3. TEST SPECIFICATIONS

3.1 Standards

ETSI EN 301 489-1 V1.3.1 (2001-09): Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) Standard for radio equipment and services; Part 1 common technical requirements.

ETSI EN 301 489-7 V1.1.1 (2000-09 Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) Standard for radio equipment and services; Part 7 Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunication systems (GSM and DCS).

Emission requirements:

EN 55 022 (1998)::	Limits and methods for measurement of radio disturbance characteristics of information technology equipment (ITE). Class B.

Immunity requirements:

EN 61000-4-2 (1995): Required test level:	Electrostatic discharge requirements. ± 2 kV, ± 4 kV contact discharge. ± 2 kV, ± 4 kV, ± 8 kV air discharge.
EN 61000-4-3 (1995): Required test level:	Radiated radio frequency electromagnetic field - Immunity test. Normal mode: 3 V/m, AM 80% (1 kHz), 80-1000 MHz.

The standards above refers to basic standards. These are found in section 4, Test Summary, by name and edition.

3.2 Additions, deviations and exclusions from standards and accreditation

Radiated radio frequency electromagnetic field - Immunity test has been carried out at 10 V/m in the frequency range 80 to 2000 MHz.

A GSM communication link has not been established during test.

No other additions, deviations or exclusions have been made from standards and accreditation.

3.3 Mode of operation during the test

The EUT was supplied with an internal battery.
The EUT was tested in normal operation.
The security device of the case was activated from internal Minicall. The GSM module was active during test but any GSM network was not present during the test of radiated emission and radiated immunity.
During the immunity tests, a lamp panel was connected to the trip gear release mechanism for the ink cartridge.

3.4 Compliance

The performance criteria are based on the general criteria in the standard.
The performance criteria for the security device and the locking device are specified by the manufacturer.

Criterion A: The apparatus shall continue to operate as intended during the test.
The security device or the locking device of the case shall not be influenced by the test.
No release of the color cartridges. No startup of an alarm call via GSM is allowed.

Criterion B: The apparatus shall continue to operate as intended during the test.
The security device or the locking device of the case shall not be influenced by the test.
No release of the color cartridges. No startup of an alarm call via GSM is allowed.

3.5 Performance verification

The security device or the locking device of the case has been supervised via a lamp panel.
Verification equipment

Equipment	Manufacturer
Lamp panel	SQS Security Qube System AB

4. TEST SUMMARY

The test has been carried out at the Intertek Semko AB premises in Kista, Sweden.
The results in this report apply only to sample tested:

Basic standard	Description	Result
Emission		
EN 55 022	**Radiated electromagnetic field in the frequency range 30 MHz to 1000 MHz** The EUT complies with the Class B limits. The margin to the limit was at least 10 dB. See diagram 1 and Figure 1.	PASS
Immunity		
EN 61 000-4-2	Electrostatic discharge Test level 4 kV contact discharges and 8 kV air discharges. The EUT operated without any degradation during the test The EUT complies with the performance criterion A. Test set upp: See Figure 2.	PASS
EN 61 000-4-3	**Radiated electromagnetic fields in the frequency range 80 – 2000 MHz** Test level 10 V/m with 80% AM @ 1 kHz. The EUT operated without any degradation during the test The EUT complies with the performance criterion A. Test set upp: See Figure 3.	PASS

5. TABLES AND DIAGRAMS

Diagram 1, Radiated emission, Peak overview sweep

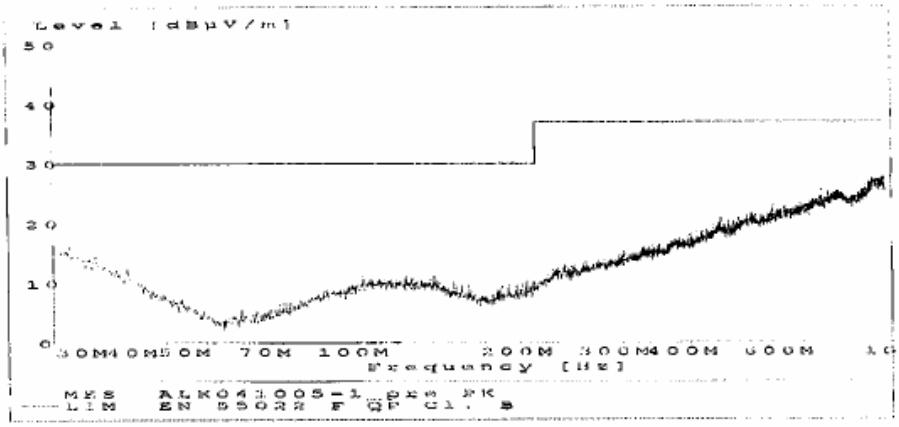
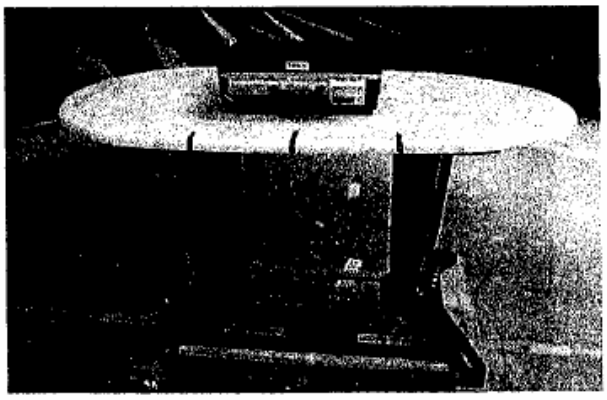


Table 1: Measurement results

Fulfil requirements: Yes

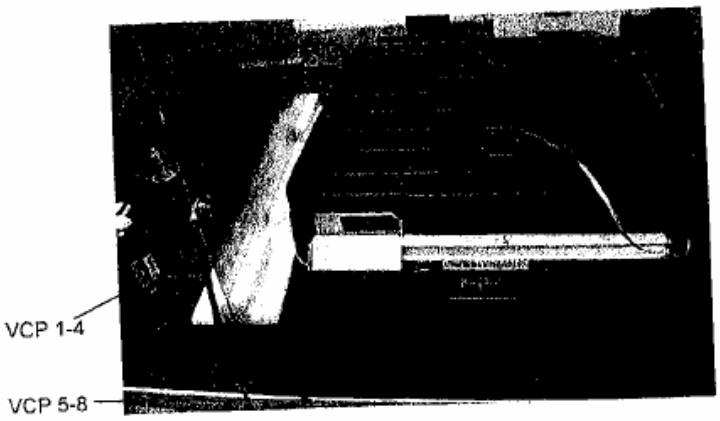
Figure 1: Test Set-up



6. IMMUNITY: PHOTO AND SET-UP

6.1: EN 61 000-4-2, ESD.

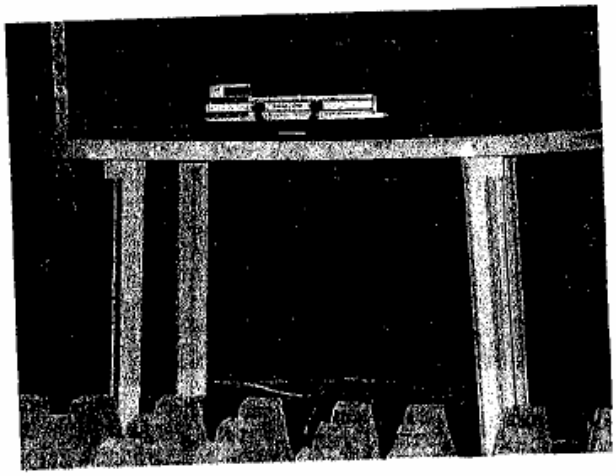
Figure 2: Test set-up and shooting points



No other discharges were obtained.

6.2: EN 61 000-4-3, Radiated immunity RF fields; 80-2000 MHz

Figure 3 . Test set-up.



7. INTERTEK SEMKO EMC CENTER MEASUREMENT UNCERTAINTIES

All uncertainties are given with a level of confidence of approximately 95% (k=2) and are the maximum values within the complete range. Measurement uncertainties are calculated in accordance with EA-4/02:1997.

Continuous conducted disturbances with AMN in the frequency range 9 kHz to 30 MHz	± 3,6 dB
Measurement uncertainty with a passive probe in the frequency range 0,15 - 30 MHz	± 3,0 dB
Measurement uncertainty for discontinuous conducted disturbances	± 3,8 dB
Measurement uncertainty for disturbance power	± 4,2 dB
Measurement uncertainty for radiated disturbance	
Uncertainty for the frequency range 30 to 1000 MHz at 1 m	± 6,2 dB
Uncertainty for the frequency range 30 to 1000 MHz at 3 m	± 4,8 dB
Uncertainty for the frequency range 30 to 1000 MHz at 10 m	± 4,6 dB
Uncertainty for the frequency range 1,0 to 2,75 GHz at 3 m	± 5,6 dB
Uncertainty for the frequency range 2,75 to 6,0 GHz at 3 m	± 5,8 dB
Uncertainty for the frequency range 6,0 to 12,8 GHz at 3 m	± 6,2 dB
Uncertainty for the frequency range 12,8 to 18 GHz at 3 m	± 6,7 dB
Measurement uncertainty for radiated power above 1 GHz	± 4,1 dB
Measurement uncertainty for harmonics	± 8,4 %
Measurement uncertainty for voltage fluctuations and flicker	± 9,2 %
Measurement uncertainty for ESD immunity test	
Air discharge	
Voltage	± 26 %
First peak current	± 27 %
Rise time	± 37 %
Current at 30 and 60 ns	± 43 %
Contact discharge	
Voltage	± 57 %
First peak current	± 23 %
Rise time	± 38 %
Current at 30 and 60 ns	± 42 %
Measurement uncertainty for radiated immunity, EN 61 000-4-3	
3 V/m 26 MHz to 1000 MHz	± 0,8 V/m / ± 2,4 dB
10 V/m 26 MHz to 1 GHz	± 2,5 V/m / ± 2,2 dB
10 V/m 1,0 GHz to 2,5 GHz	± 2,9 V/m / ± 2,5 dB
Measurement uncertainty for fast transient/burst immunity tests	± 32 %
Measurement uncertainty for surge immunity test	± 13,0 %
Measurement uncertainty for immunity to conducted disturbances	
CDN	
3 V	± 0,9 V / ± 2,7 dB
10 V	± 3,1 V / ± 2,7 dB
EM clamp	
3 V	± 1,3 V / ± 3,7 dB
10 V	± 4,3 V / ± 3,7 dB
Current clamp (BCI)	
3 V	± 1,5 V / ± 4,3 dB
10 V	± 5,0 V / ± 4,3 dB
Direct injection	
3 V	± 1,3 V / ± 3,8 dB
10V	± 4,4 V / ± 3,8 dB
Measurement uncertainty for power frequency magnetic field immunity test	± 34 % / ± 2,5 dB
Measurement uncertainty for voltage dips, short interruptions and voltage variations	
Time	± 4,6 %
Voltage	± 6,4 %

Varuinformationsblad

SQS
Security Qube System

Utfärdat 2006-05-03	Utgåva 3:4	Dok nr: QC07-017
Handelsnamn		
Q-INK		

1. Företagsidentifikation

Produkt	Färg för infärgning av sedlar
Produktkod	104460 Q-ink, röd 104461 Q-ink, svart
Tillverkare	SQS Security Qube System AB, Maskinvägen 13, Box 715 SE-931 27 Skellefteå, Tfn: +46 910 714100 Fax: +46 910 714109
Nödtelefon	+46 910 714100

2. Sammansättning

Innehåll:

Prod	CAS-nr:	Eu-nr:	%	Symbol	R-fras
Perylenpigment					
Carbon black					
Azofärgämne					
Metalloxider					
Fosfatestrar				Xn	R22

3. Farliga egenskaper

Farligt att förtära. Se även punkt 11.

Hälsoskadlig

4. Första hjälpen

Inandning	Sörj för frisk luft och vila. Vid oregelbunden andning eller medvetslöshet ge andningshjälp. Vid medvetslöshet placera personen i liggande framstupa sidoläge och kontakta läkare eller sjukhus.
Hudkontakt	Tag av förorenade kläder. Tvätta huden med tvål och mycket vatten.
Ögonkontakt	Skölj rikligt med vatten i minst 15 min. Om irritation kvarstår, kontakta läkare.
Förtäring	Skölj ur munnen med vatten. Drick mycket vatten (ge dock inget till medvetslösa personer).

Varuinformationsblad

SQS
Security Qube System

5. Åtgärder vid brand	Bildar toxiska produkter vid upphettning och brand.
Släckmedel	Vattendimma, skum, pulver, koldioxid
Förbränningsgaser	Kol-, fosfor-, kväve-, och svaveloxider, låga halter saltsyra
Personligt skydd	Komplett andningsapparat (övertryckssystem, typ rökdykarutrustning) och skyddsdräkt.
6. Åtgärder vid spill/oavsiktliga utsläpp	
Personlig skyddsutrustning	Skyddshandskar av nitril, glasögon.
Spill och sanering	Pumpa upp spillet till avsedd behållare. Sug upp återstoden med material såsom torr sand, jord eller sågspån. Förhindra utsläpp i avlopp eller vattendrag. Se till att ventilationen är god.
7. Hantering och lagring	
Yrkeshygien	Sörj för god ventilation vid upprepad exponering. Undvik förtäring, hud- och ögonkontakt. Hanteras i enlighet med god industriell hygien och gällande lagstiftning.
Lagringsmöjligheter	Förvaras väl tillsluten.
Ämnen som skall hållas åtskilda	Se punkt 10.
8. Begränsning av exponeringen/personliga skyddsåtgärder	
Komponenter med hygieniska gränsvärden	Inga
Personlig skyddsutrustning	Använd skyddshandskar av nitrilgummi och skyddsglasögon. Vid tillbud/brand se punkt 5.
9. Fysikaliska och kemiska egenskaper	
Varubeskrivning	**Röd eller svart sedelinfärgningsvätska**
Fysikaliska egenskaper:	
Fryspunkt	< -30 °C
Kokpunkt	> 100°C
Flampunkt	130°C
Självantändning	> 300°C
Explosionsgräns	inga uppgifter
Ångtryck	< 0,5 mbar vid 20 °C
Densitet	1,07 g/cm^3
Vattenlöslighet	något blandbar
10. Stabilitet och reaktivitet	
Tillstånd som bör undvikas	Färgen är svårantändlig under normala förhållanden, men kan vid extrema betingelser fatta eld.
Ämnen/material som bör undvikas	Färgen får ej komma i kontakt med oxidationsmedel (väteperoxid, kaliumklorat, kaliumpermanganat, salpeter m.fl.) och starka baser.
Farliga sönderfallsprodukter	Inga under normala lagringsbetingelser. Vid temperaturer över 190 °C eller i sur miljö kan skadliga föreningar bildas såsom kolmonoxid, formaldehyder, kväve- och fosforoxider.

Varuinformationsblad

SQS
Security Qube System

11. Toxikologisk information **Akut toxicitet**	LD50 råtta oralt ≈ 1100-1600mg/kg LD50 marsvin dermalt >20 g/kg LC50 råtta inhalation > 8800 mg/m^3/4h
Primär irritation	Hud; ej irriterande, ögon; måttligt irriterande.
Hudsensibilisering	Ej sensibiliserande
Skadliga effekter på människan	Farligt att förtära (kan ge yrsel, huvudvärk och har narkosisk effekt) Inga av de ingående komponenterna har rapporterats cancerogena.
Övrig information	Toxikologisk data är grundad på uppgifter om varje enskild komponent i färgen.
12. Ekotoxikologisk information **Nedbrytbarhet**	Bologiskt nedbrytbar:> 90 %, 28 dagar Metod: Zahn-Wellens test
Utsläpp i vatten	Vattenpåverkan farlighetsklass 1= måttligt farlig (enligt tysk klassning).
Utsläpp i luft	P.g.a. lågt ångtryck torde atmosfärisk koncentration vara låg vid normal temperatur.
13. Avfallshantering	Samlas upp i välmärkta behållare och skickas till anläggning för destruktion/förbränning.
14. Transportinformation	Förvaras åtskilt från livsmedel och tobak
15. Gällande bestämmelser **Klassificering, märkning och symbol**	 Hälsoskadlig Xn Hälsoskadlig.
R-fraser	R22 Farligt vid förtäring
S-fraser	S 2 Förvaras oåtkomligt för barn S 20 Åt och drick ej under hantering S 25 Undvik kontakt med ögonen S 29 Får ej tömmas i avloppet
16. Övrig information	Uppgifterna i detta varuinformationsblad är baserat på ingående komponenters data. Vid daglig exponering har symtom på orolig mage rapporterats. Sörj därför för god ventilation samt använd skyddshandskar.

— — — — — — — — —

APPENDIX C

the swiss power source

renata batteries

Article Safety Data Sheet - Lithium Batteries [1)]

Edition date: July 14th, 2006

RENATA SA
Kreuzenstrasse 30
CH-4452 ITINGEN / Switzerland
Tel: +41 61 975 75 75
Fax: +41 61 975 75 95

Section I - Product identification

Product Name:	Primary (non-rechargeable) Lithium Battery	Nominal Voltage:	3.0 V
Model:	Coin Type Cells		
Chemical System:	Manganese Dioxide Lithium Primary	Designated for Recharge:	No

Section II - Hazardous ingredients

IMPORTANT NOTE: The battery should not be opened or exposed to heat because exposure of the following ingredients contained within could be harmful under some circumstances.

Chemical Name	CAS No.
Manganese Dioxide (MnO_2)	1313-13-9
Lithium*	7439-93-2
Propylene Carbonate (PC)	108-32-7
1,2 dimethoxy ethane (DME)	110-71-4
Lithium Perchlorate ($LiClO_4$)	7791-03-9

* Approximate weight content of lithium in Renata Lithium Batteries can be found in Annex I

Section III - Possible Hazards

**The chemicals mentioned in Section II are contained in a hermetically sealed can.
Risk of exposure occurs only if the battery is mechanically or electrically abused
(see Safety precautions in Section VII).**

The most likely risk is acute exposure when a cell vents.
DME is believed to be slightly to moderately toxic, PC moderately toxic.
$LiClO_4$ is irritating to skin, eyes and mucous membranes.
Lithium can cause thermal and chemical burns upon contact with the skin.
Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

[1)] **This Article Safety Data Sheet is provided as a service to our customers.**
Based on the definition of the term 'article' in the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200, there is no requirement for a Material Safety Data Sheet (MSDS) for lithium primary coin cells. Notification is not required because these products are 'articles' that do not release a covered toxic chemical under the normal conditions of processing or use.

Section IV - First Aid Procedures

Skin and Eyes:

In case of skin contact with contents of battery, flush immediately with copious amounts of water for 15 minutes. Do not inhale leaked material. If irritation persists, get medical help.

For eye contact, flush with copious amounts of water for 15 minutes and get immediate medical attention.

Section V - Fire Fighting Instructions

Flash point of electrolyte solvents (°C)	DME: -6, PC: 135
Extinguishing Media	see Special Fire Fighting Procedure
Flammable Limits	Not available
Special Fire Fighting Procedure:	In case of fire in an adjacent area, use water. CO_2 or dry chemical extinguishers if cells are packed in their original containers since the fuel of the fire is basically paper products. For bulk quantities of unpackaged cells use LITH-X (Graphite Base). In this case, do not use water. As with any fire, wear self-contained breathing apparatus to avoid inhalation of hazardous decomposition products.

Section VI - Accidental Release

Steps to be taken in case material is released or spilled:

The preferred response is to leave the area and allow the batteries to cool and the vapours to dissipate. Avoid skin and eye contact or inhalation of vapours. Collect all released material in a plastic lined metal container and remove spilled liquid with absorbent. Doing this, protect your skin and eyes with gloves and protection glasses.

Section VII - Handling and Storage

When used correctly, lithium batteries provide a safe and dependable source of power. However, if they are misused or abused leakage, venting, or in extreme cases explosion and/or fire may result.

Make sure to observe the following warnings.

1. Do not insert batteries in reverse. Observe the polarity markings on battery and equipment
2. Do not short-circuit batteries
3. Do not charge batteries
4. Do not force discharge batteries
5. Do not mix batteries
6. Exhausted batteries should be immediately removed from equipment and disposed of
7. Do not overheat batteries by exposure to high temperatures and direct sunlight.
8. Do not weld or solder directly to batteries
9. Do not dismantle batteries
10. Do not deform batteries
11. Do not dispose of batteries in fire
12. A lithium battery with a damaged container should not be exposed to water
13. Do not allow children to replace batteries without adult supervision

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14. Keep batteries out of the reach of children. In case of ingestion of a cell or battery, the person involved should seek medical assistance promptly.
15. Equipment intended for use by children should have battery compartments which are tamper-proof
16. Do not encapsulate and/or modify batteries
17. Store unused batteries in their original packaging and keep them away from metal objects which may short-circuit them. Storing unpackaged cells together could result in cell shorting and heat build-up.
18. When discarding batteries with solder tags, insulate the tags by wrapping them with tape, foil, etc.
19. Store and display batteries in there original packaging in well ventilated, dry and cool conditions.
20. Avoid storing or display batteries in direct sun or in places where they get exposed to rain
21. Do not stack battery cartons on top of each other exceeding a specified height. The height is clearly dependent on the strength of the packaging. As for general rule this height should not exceed 1.5 m for cardboard packages or 3 m for wooden cases. The above recommendations are equally valid for storage conditions during prolonged transit. Thus, batteries should be stored away from ship engines and not left for long periods in unventilated metal box cars (containers) during summer.

Section VIII - Exposure Controls / Personal Protection

Respiratory protection (specify type):	Not necessary under conditions of normal use.
Ventilation:	Not necessary under conditions of normal use.
Protective gloves:	Not necessary under conditions of normal use.
Eye protection:	Not necessary under conditions of normal use.
Other protective clothing or equipment:	Not necessary under conditions of normal use.

Section IX - Physical and Chemical Properties

The chemicals mentioned in Section II are contained in a hermetically sealed battery can. Under conditions of normal use, the chemicals will not be released.

Section X - Stability and Reactivity

Lithium batteries are contained in a stable steel container and are hermetically sealed to avoid any chemical release under conditions of normal use.

Conditions to avoid: See Section VII

Section XI - Toxicological Information

Swallowing:
Ingestion of a battery can be harmful. For US call The National Capital Poison Control Center (1-800-222-1222) day or night - for advice and follow-up. For other countries please contact the local Tox Centers.

Section XII - Ecological Information

Under normal condition of use, the battery is hermetically sealed and does not release chemicals listed in Section II. It does not pose a physical or health risk to users.

Section XIII - Disposal Considerations

Waste disposal method:

a) Dispose in accordance with **appropriate national and international regulations.**

European Community: according to Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE), Annex II, batteries have to be removed from any separately collected WEEE. The collected batteries have to be treated according to the Battery directive 1991/157/EEC.

US: Lithium batteries are neither specifically listed nor exempted from the Federal Environmental Protection Agency (US EPA) hazardous waste regulations. The only material of possible concern due to its reactivity is lithium metal. However, button cells contain so little lithium that they can be disposed off in the normal municipal waste stream.
Use a professional disposal firm for disposal of mass quantities of undischarged lithium batteries.

b) Open cells should be treated as hazardous waste

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212°F (100°C). Such treatment can cause cell rupture.

Section XIV - Transportation Information

XIV.I Provisions for the international transportation (pursuant to ICAO-TI/IATA-DGR, IMDG Code, ADR, RID):

Lithium cells and batteries are subject to
ICAO-TI/IATA-DGR (Air) / IMDG Code (Sea) / ADR (Road Europe) / RID (Rail Europe)
UN 3090, Lithium batteries, 9, II

Basically they must meet Special Provision 230 of the UN Model Regulations.

However, if they meet the following requirements of Special Provision 188 of the UN Model Regulations, Special Provision A45 of the ICAO-TI/IATA-DGR (Air), Special Provision 310 of the IMDG Code, Special Provision 188 of the ADR and RID (Road and Rail Europe), they are not subject to other provisions of the above mentioned regulations:

(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium-ion cell, the equivalent lithium content is not more than 1.5 g;
(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium-ion battery, the aggregate equivalent lithium content is not more than 8 g;
(c) Each cell or battery is of the type proved to meet the requirements of each test in the *Manual of Tests and Criteria*, Part III, sub-section 38.3;
(d) Cells and batteries are separated so as to prevent short circuits and are packed in strong packagings, except when installed in equipment; and
(e) Except when installed in equipment, each package containing more than 24 lithium cells or 12 lithium batteries shall in addition meet the following requirements:
  (i) Each package shall be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged **(Specimen see Annex II).;**
  (ii) Each shipment shall be accompanied with a document indicating that packages contain lithium batteries and that special procedures should be followed in the event a package is damaged **(Specimen see Annex IV);**

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(iii) Each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and
(iv) Except in the case of lithium batteries packed with equipment, packages may not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell, except in the case of a lithium-ion cell the "equivalent lithium content" in grams is calculated to be 0.3 times the rated capacity in ampere-hours.

RENATA's lithium cells and batteries do meet the above mentioned provisions.
They can be described as "Not restricted, as per Special Provision ..." in the transport documents.

XIV.II Provisions for shipments by air into, out of, or within the U.S. (pursuant to 49 CFR)

In addition to the provisions mentioned under XIV.I for shipments into, out of, or within the US the following provisions of the 49 CFR apply:

Pursuant to Special Provision A 100 of the 49 CFR primary (non-rechargeable) lithium cells and batteries are forbidden for transport on passenger carrying aircraft. To avoid these cells and batteries being loaded on board of passenger carrying aircrafts, packages must be marked pursuant to § 173.185 (b)(5) **(Specimen see Annex III),** even if the packaging are shipped via highway, rail or vessel. RENATA's primary lithium cells and batteries do meet the provisions of § 173.185 (b).

GENERAL HANDLING INSTRUCTIONS

Battery cartons should be handled with care. Rough handling may result in batteries being short circuited or damaged. This may cause leakage, explosion, or fire. (refer also to Section VII)

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ANNEX I

APPROXIMATE WEIGHT CONTENT OF LITHIUM IN RENATA LITHIUM BATTERIES

Model no.	Approx. % of total weight of lithium	Approx. weight of battery (g)/cell
CR927	1.9	0.51
CR1025	1.5	0.58
CR1216	1.2	0.65
CR1220	1.5	0.74
CR1225	1.7	0.9
CR1616	1.3	1.1
CR1620	1.7	1.2
CR1632	2.1	1.8
CR2016	1.5	1.7
CR2016 MFR	1.5	1.7
CR2016 alterna	1.1	1.8
CR2025	2.0	2.5
CR2025 MFR	2.0	2.5
CR2025 alterna	2.0	2.5
CR2032	2.0	2.7
CR2032 MFR	2.0	2.8
CR2032 alterna	2.0	3.0
CR2320	1.7	2.6
CR2325	1.7	3.0
CR2430	2.1	4.0
CR2450N	2.7	5.8
CR2477N	3.2	8.3

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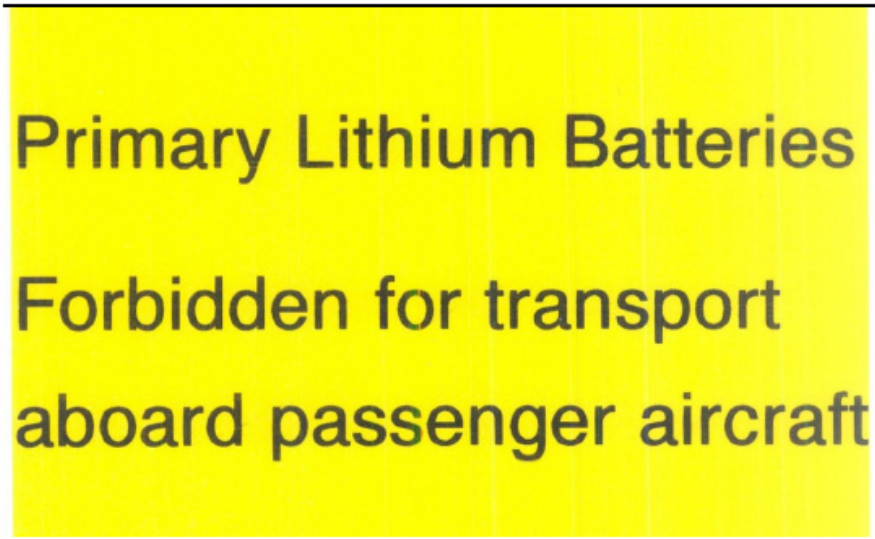
ANNEX II

This label, in English and in the language of the shipment's origin, is required for shipments containing more than 24 lithium primary cells or more than 12 lithium primary batteries.

ANNEX III



This label is required for shipments containing one or more cells/batteries into, out of, or within the U.S. via highway, rail, vessel or cargo-only aircraft. The label must be in contrasting colour and the letters must be 6 mm (0.25 in) in height for packages weighting not more than 30 kg.

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ANNEX IV

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SP188 UN Model Reg., A45 ICAO-TI/IATA-DGR, 310 IMDG Code, 188 ADR/RID
SHIPPER'S DECLARATION FOR LITHIUM CELLS/BATTERIES
Hereby we declare that the PRIMARY LITHIUM CELLS/BATTERIES contained in this shipment meet the above mentioned provisions for "not restricted". Do not damage or mishandle the package/s. If package/s is/are damaged, the cells must be quarantined, inspected and repacked.
DÉCLARATION DE L'EXPÉDITEUR POUR PILES AU LITHIUM / BATTERIES AU LITHIUM
Avec ce-ci nous déclarons que les PILES/BATTERIES PRIMAIRES AU LITHIUM contenues dans cet envoi satisfont aux dispositions susmentionnées exigées pour "non réglementés". Ne pas endommager l'emballage! Traiter avec soin!Si l'emballage est endommagé, les piles doivent être isolées, inspectées et remballées.
ERKLÄRUNG DES VERSENDERS FÜR LITHIUMZELLEN/-BATTERIEN
Hiermit erklären wir, dass die in dieser Sendung enthaltenen LITHIUM-PRIMÄRZELLEN/-BATTERIEN die Bedingungen der oben erwähnten Sonderbestimmungen für "nicht eingeschränkt" erfüllen. Verpackung nicht beschädigen, vorsichtig behandeln! Wenn Verpackung beschädigt, Zellen isolieren, inspizieren und neu verpacken.
For emergency information call RENATA SA at +41 61 319 28 27 referring to

Consignee

RENATA AG 4452 ITINGEN

Packing List No. 80047913 Date: 03.01.2003 Page: 1

Client No.: Ref.:

Shipment:

Either a separate declaration or a label attached to an existing document, e.g. to the packing list, is required.

Special Provision 188 UN Model Regulations,
SP A45 ICAO-TI/IATA-DGR, SP 310 IMDG Code, SP 188 ADR, SP 188 RID
SHIPPER'S DECLARATION FOR LITHIUM CELLS/BATTERIES
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For emergency information call RENATA SA at +41 61 319 28 27

— END —