EC TYPE EXAMINATION CERTIFICATE

MED-B-15191

In compliance with Module B of Council Directive 96/98/EC of the European Parliament and as amended by the Council Directive 2013/52/EU of 14 November 2013, this certificate is issued to the manufacturer:

Jotron AS

And applies to the product

9GHz Search and Rescue Transponder
Tron SART 20
and
SIMRAD SA70 RADAR SART

This certificate attest that provisions according to type examination requirements given in

SOLAS 74 as amended, Regulation III/6, IV/7
IMO Res.A.530(13)
IMO Res.A.802(19)
IMO Res.A.694(17)
IMO Res.MSC.36(63)-(1994 HSC Code) 8
IMO Res.MSC.36(63)-(1994 HSC Code) 14
IMO Res.MSC.97(73)-(2000 HSC Code) 8
IMO Res.MSC.97(73)-(2000 HSC Code) 14
ITU-R M.628-3 (11/93)
IEC 60945 (2002) incl. IEC 60945 Corr. 1 (2008)
IEC 61097-1 (2007)

This certificate replaces certificate no MED-B-13272, which is revoked.

This certificate loses its validity if the manufacturer makes any changes or modifications to the approved equipment, which have not been notified to and agreed upon with Nemko. Software changes and updates: - See Product description in the Annex. Should the specified regulations or standards be amended during the validity of this certificate, the products are to be re-approved prior to them being placed on board vessels to which the amended regulations or standards apply.

The attached Schedule of Approval forms part of this certificate. The certificate remains valid unless cancelled or revoked, provided the conditions in the attached schedule are complied with and the equipment remains satisfactory in service.

This product also fulfils the requirements of directive 2014/93/EU of 25 July 2014, which will enter into force 14 August 2015.

Oslo, 2015-05-07

Date of expiry: 2020-05-07

Roy Uggerud
Nemko AS

Annex I to EC Type-Examination Certificate, No. MED-B-15191

SCHEDULE OF APPROVAL

Product description

Main unit: Jotron TRON SART 20 - Radar Transponder – Maritime search and rescue (Module 83010)
Battery module - two high power C-size Lithium batteries LSH 14 Light 3v6, SAFT (Module 82615)
Transceiver module (Module 82616)
Software module (Module 84151)
Antenna
Housing
OEM variant SIMRAD SA70 RADAR SART is identical both electrically and mechanically with TRON SART 20

Any limitations on the acceptance or use of the product or specific requirements

9 GHz radar transponder TRON SART20 to be used on vessels and life rafts in the maritime service
TRON SART20 performs a secondary alarm when search and rescue units are searching for a life raft/lifeboat in distress.

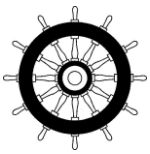
The approval documentation

Jotron AS – User Manual, 84245_UM_SART20_A, rev. 14 September 2007
Jotron AS –Technical Manual, 84150_TM_SART20_B, rev. 24 February 2008
Jotron AS – Principle Diagrams, Transceiver board, TRON SART20, KP-82617_top, rev. 0719, X-82617_bottom, rev. 0719
Jotron AS – Block Diagrams, Transceiver board TRON SART20, E-82617, rev. 0719, FD-83010, rev. 19 September 2007
Jotron AS – Circuit Diagrams, Transceiver board TRON SART20, E-82617, rev. 0719
Jotron AS – Part/Component list
Jotron AS - Label Layout
Jotron AS - ISO 9000 Certificate
Jotron AS – QA manual
Jotron AS – Test report of 6 February 2008, rev A, project no. SART_MK2_200502, Test of receiver front end protection, thermal shock and water tightness, drop onto hard surface. All tests supervised by Nemko AS.
Jotron AS – Statement OEM MED-B Certification, dated 27.03.12
Nemko Comlab – Test plan no. 93193/5, of 1 October 2007, rev. 1.0
Nemko Comlab – Test report no. 93193/10, of 11 March 2008, IEC 61097-1:1992, Radar Transponder – Maritime search and rescue (SART) – Operation and performance requirements, methods of testing and required results
Nemko Comlab – Test report no. 93193/11, of 11 March 2008, IEC 60945:1996 and IEC 60945 ed. 4:2002, Parts of clause 9 and 10, Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required results (Third edition, 1996-11; Fourth edition, 2004)
Nemko Comlab – Test report 93193/12, of 11 March 2008, IEC 61097-1:1992, Radar Transponder – Maritime search and rescue (SART) – Operation and performance requirements, methods of testing and required results (First edition, 1992-07)
Nemko AS – Amendment to Test report 93193/12, of 10 March 2011, Comparison and evaluation of changes between IEC 1097-1(1992) and IEC 61097-1(2007)
Nemko Comlab – Test report no. 93193/12, of 11 March 2008, IEC 60945:1996 and IEC 60945 ed.4:2002, Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required results (Third edition, 1996-11; Fourth edition, 2002-08)

Alternative approval documentation for SIMRAD SA70 RADAR SART

Navico/SIMRAD – 000-10738-001User Manual, SA70 RADAR SART.

Limitations/restrictions



"The Mark of Conformity" (i.e. the Wheel mark) may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production control phase module D (Production Quality Assurance), E (Product Quality Assurance), or F (Product Verification), of Annex B of the Directive (MED) is fully complied with and controlled by a written inspection agreement with a notified body."

---------- End of certificate ----------

EC QUALITY SYSTEM CERTIFICATE
MODULE D

MED-D-17051

This is to certify that Nemko AS did undertake the relevant Quality Assessment Procedures for the products of the manufacturer:

Jotron AS

which was found to comply with the requirements of the Navigation and Radio Communication equipment, of the Marine Equipment Directive (MED) 2014/90/EU.

The manufacturer maintains and applies a quality system in accordance with the requirements of the Marine Equipment Directive (MED), 2014/90/EU, Annex II, module D. The quality system for the product(s) defined in the annexed schedule has been assessed with respect to the procedure of conformity assessment described in the Directive.

Scope:	A.1/4.18	9 GHz SAR transponder
	A.1/4.32	Universal automatic identification system equipment (AIS)
	A.1/4.55	AIS SART equipment
	A.1/5.6	406 MHz EPIRB (COSPAS-SARSAT)
	A.1/5.17	Portable survival craft two-way VHF radiotelephone apparatus

This certificate replaces certificate no MED-D-17051 Rev. 00, which is revoked.

This certificate loses its validity if the manufacturer makes any changes or modifications to the approved quality system, which have not been notified to, and agreed with the notified body named on this certificate and/or after lapse of time, withdrawal or revocation of the EC Type Examination (Module B) Certificate.

Annual periodical audits will be held to verify the validity of this certificate.

Oslo, 2019-05-16

Date of expiry: 2022-01-30

Roy Uggerud
Nemko AS

Limitations/restrictions

"The Mark of Conformity" (i.e. the Wheel mark) may only be affixed to the above type approved equipment and a Manufacturer's Declaration of Conformity issued when the production control phase module D (Production Quality Assurance) of Annex B of the Directive (MED) is fully complied with and controlled by a written inspection agreement with a notified body."

SCHEDULE OF APPROVAL

Annex I to EC Type-Examination Certificate, No. MED-D-17051

Item #1		Module B data			USCG approval number
A.1/4.18	Tron SART 20 SIMRAD SA70 RADAR SART	EC Type-Examination No. MED-B-15191	Notified Body Nemko AS #0470	Date of expiry 2020-05-07	N/A
	9 GHz SAR transponder (SART)				
Item #2		Module B data			USCG approval number
A.1/4.32	Tron AIS TR-8000	EC Type-Examination No. 4581/001/ 4322773/15	Notified Body BSH #0735	Date of expiry 2020-12-13	165.155/EC0735/ 4322773
	Universal automatic identification system equipment (AIS)				
Item #3		Module B data			USCG approval number
A.1/4.55	Tron AIS-SART SIMRAD SA70 AIS-SART	EC Type-Examination No. MED-B-15121	Notified Body Nemko AS #0470	Date of expiry 2020-03-19	N/A
	AIS SART Equipment				

Item #7		Module B data			USCG approval number
A.1/5.6	Tron 60S/Tron 60GPS SIMRAD EP70EPIRB/ SIMRAD EG70EPIRB	EC Type-Examination No. MED-B-15192	Notified Body Nemko AS #0470	Date of expiry 2020-05-08	N/A
	406 MHz EPIRB (COSPAS-SARSAT)				
Item #8		Module B data			USCG approval number
A.1/5.6	Tron 40VDR	EC Type-Examination No. MED-B-16251	Notified Body Nemko AS #0470	Date of expiry 2021-09-28	N/A
	406 MHz EPIRB (COSPAS-SARSAT)				
Item #9		Module B data			USCG approval number
A.1/5.6	Tron 40S MKII	EC Type-Examination No. MED-B-16511	Notified Body Nemko AS #0470	Date of expiry 2021-12-28	N/A
	406 MHz EPIRB (COSPAS-SARSAT)				
Item #11		Module B data			USCG approval number
A.1/5.17	Tron TR30 GMDSS and Maritime VHF Radio	EC Type-Examination No. BABT-MED000108 Issue 01	Notified Body TUV SUD BABT #0168	Date of expiry 2021-09-13	N/A
	Portable survival craft two-way VHF radiotelephone apparatus				

Place(s) of production: Item #1, #3, #7, #8, #9 and #11 are produced at Jotron's subsidiary UAB Jotron, Lithuania. Item #2, is partly produced at UAB Jotron and at Jotron AS, Tjodalyng, Norway.

---------- End of certificate ----------

Nemko Canada Inc

CERTIFICATE OF COMPLIANCE

Nemko Canada Inc certifies that the apparatus detailed below complies with all applicable requirements of the stated specifications

Certification Number : 2131A-TRONSART20 **Certificate Number** : 1-01542

Certificate Holder : Jotron AS
Østbyvei

Model Name : Tron SART20

Type of Equipment : GMDSS-Global Maritime Distress and Safety System

Specifications : RSS 188 Issue 1

Test Laboratory : Nemko Comlab

IC OATS number : 4443

Antenna Information : Internal

Frequency (MHz)	Output Power (Watts)	Emission Designation
9200-9500	Minimum 0.4 (EIRP)	300MX0N

Certification of equipment means only that the equipment has met the requirements of the above noted specification. Licence applications, where applicable to use certified equipment, are acted on accordingly by the issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada / La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada

Date of Issue: **17 June 2008**

Authorized by: **For Nemko Canada Inc**

S.C. Beck, Director of Certification

FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Date of Grant: 5/16/08

Application Dated: 4/2/08

Attention: Eirik Storjordet, Certification Manager

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER	**VRVTRONSART20**
Name of Grantee	**Jotron AS**
Equipment Class :	Radar Transponder
Notes:	Search and rescue radar transponder

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
GM	**80.1101(c)(6)**	**9200 - 9500**	**0.4**	**0.65 %**	**300MX0N**

GM: This unit meets requirements for GMDSS use as contained in Subpart W of Part 80.

EA129098

Declaration of Conformity

We, the undersigned Manufacturer

Company	Jotron AS

Certify and declare under our responsibility that the following product:

Product Description	Search and rescue radar transponder
Manufacturer	Jotron AS
Brand Name	Jotron
Model/Type	Tron SART20, Consist of; 82615 Battery Sart20/AIS SART 5 year Maint.kit

Is tested to and conforms with the essential test suites included in the following standards, which are in force within the EEA:

Standard	**Issue date**	**Certificate No.**
IEC 61097-1	2007	MED-B-15191 Nemko MED-D-17051 Rev.02 Nemko
IEC 60945 ed.4.0 including IEC 60945 Corrigendum 1	2002, Corr.2008	
EN 50581	2012	
ISO 9001	2015	Certificate no. 900022
ISO 14001	2015	Certificate no. 901317

And therefore complies with the essential requirements of the following directives:

Directive Name	**Directive number**	**Further identification**
MED	2014/90/EU	Directive 2014/90/EU repealing Directive 96/98/EC, Applies also to Regulation (EU) 2019/1397
RoHS	2011/65/EU	Restriction of Hazardous Substances Applies also to Directive (EU) 2015/863

Product Safety Information

Tron SART 20, AIS-SART battery

Art. no 82615

MANUFACTURER:

Jotron AS

PRODUCT DESCRIPTION

Listed product is a SART battery module for use on marine Search and Rescue Transponder containing lithium batteries. The battery pack has fulfilled the test according to UN Manual of Test and Criteria ST/SG/AC.10/11 fifth revised edition.

GENERAL PRODUCT INFORMATION

The Tron AIS-Sart / SART 20 battery module consists of primary lithium battery cells;
The product consists of 2 battery cells in one pack consisting of 1.96-gram lithium in total.

DO NOT ATTEMPT TO RECHARGE THE BATTERY

The Tron SART / SART 20 battery module should only be disassembled after guidance from manufacturer or their representatives.

HAZARDOUS SUBSTANCES

Under EC (European Chemical Agency (ECHA)) and US (Occupational Safety and Health Admin (OSHA)) legislation this product is classified as a manufactured article, which does not release, or otherwise result in exposure to a hazardous chemical under normal condition of use. This product is therefore exempted from the requirement of a dedicated Material Safety Data Sheet (MSDS).
The following information is considered as guidance and as courtesy;

Information from SAFT concerning battery cell type LSH-14 light with chemical system Lithium Metal Thionyl Dichloride (Li-SOCl2), the product may contain the following active ingredients;

CAS.no	Material or Ingredients
7439-93-2	Lithium Metal
7719-09-7	Thionyl Dichloride
7446-70-0	Aluminum Chloride
13450-90-3	Gallium Chloride
7447-41-8	Lithium Chloride
1333-86-4	Carbon
9002-84-0	PTFE

No release or hazardous chemical will be exposed as long as the cells remain in their sealed and original condition.

Product Safety Information

Tron SART 20, AIS-SART battery

Art. no 82615

This information concerning ingredients is given in good faith and based on information from SAFT Batteries “Battery Information Sheet” Edit Nov.2012. Jotron makes no warranty, either expressed or implied, with respect to this information.

DISPOSAL INFORMATION

The product shall follow local disposal regulations with reference to electronics and primary lithium battery.

TRANSPORT INFORMATION

This product is restricted and classified as follows during transportation.

Hazard Class:	Class 9
UN ID No:	UN3090
Proper shipping name:	Lithium Metal Batteries
Packing Instruction:	968 (II) or 968 (IA) acc to IATA/ICAO regulation
Packing Instruction:	903 acc to ADR/RID/IMDG code regulations
Lithium content in total:	1.96 grams
Battery pack Net-weight:	0.15 kg

Product Safety Information

Tron SART 20, Tron AIS SART

Art. no 83010, 85037

MANUFACTURER:

Jotron AS

PRODUCT DESCRIPTION

Listed products are marine Search and Rescue Transponders containing lithium batteries.
The battery pack has fulfilled the test according to UN Manual of Test and Criteria ST/SG/AC.10/11 fifth revised edition.

GENERAL PRODUCT INFORMATION

The Tron Sart / SART 20 battery module consists of primary lithium battery cells;
The product consists of 2 battery cells in one pack consisting of 1.96-gram lithium in total.

DO NOT ATTEMPT TO RECHARGE THE BATTERY

The Tron SART / SART 20 battery module should only be disassembled after guidance from the manufacturer or their representatives.

HAZARDOUS SUBSTANCES

Under EC (European Chemical Agency (ECHA)) and US (Occupational Safety and Health Admin (OSHA)) legislation this product is classified as a manufactured article, which does not release, or otherwise result in exposure to a hazardous chemical under normal condition of use. This product is therefore exempted from the requirement of a dedicated Material Safety Data Sheet (MSDS).
The following information is considered as guidance and as courtesy;

Information from SAFT concerning battery cell type LSH-14 light with chemical system Lithium Metal Thionyl Dichloride (Li-SOCl2), the product may contain the following active ingredients;

CAS.no	Material or Ingredients
7439-93-2	Lithium Metal
7719-09-7	Thionyl Dichloride
7446-70-0	Aluminum Chloride
13450-90-3	Gallium Chloride
7447-41-8	Lithium Chloride
1333-86-4	Carbon
9002-84-0	PTFE

No release or hazardous chemical will be exposed as long as the cells remain in their sealed and original condition.

Product Safety Information

Tron SART 20, Tron AIS SART

Art. no 83010, 85037

This information concerning ingredients is given in good faith and based on information from SAFT Batteries “Battery Information Sheet” Edit Nov.2012. Jotron makes no warranty, either expressed or implied, with respect to this information.

DISPOSAL INFORMATION

The product shall follow local disposal regulations with reference to electronics and primary lithium battery.

TRANSPORT INFORMATION

This product is restricted and classified as follows during transportation.

The product is classified as follows;

Hazard Class:	Class 9
UN ID No:	UN3091
Proper shipping name:	Lithium Metal Batteries Contained in Equipment
Packing Instruction:	970 (II) acc to IATA/ICAO regulations
Packing Instruction:	Special Provision 188 acc to ADR/RID/IMDG code regulations
Lithium content in total:	1.96 grams
Battery pack Net-weight:	0.15 kg

Battery Information Sheet

Primary Li-$SOCl_2$ single cells and multi-cell battery packs

According to REACH regulation (EC 1907/2006, Art 31) and to OSHA regulation (29 CFR 1910.1200), batteries are **ARTICLES** with no intended release. As such, they are not covered by legal requirements to generate and supply an SDS or an MSDS.

This Battery Information Sheet is provided solely as information document for the purpose of assisting our customers.

1. IDENTIFICATION

1.1 Product

Lithium-thionyl dichloride primary unit cells and multi-cell battery systems composed of these cells

2. HAZARD IDENTIFICATION

The Li-$SOCl_2$ batteries described in this Battery Information Sheet are sealed units which are not hazardous under normal operating conditions in accordance with manufacturer's recommendations, as stated in the user's manual or other similar documentation. Under normal use, the battery integrity is maintained and the active components it contains are isolated from the outside.
In particular, the battery should not be submitted to any mechanical (opening, puncture, immersion), thermal (burning, heating to temperatures above the normal temperature range of the product) or electrical abuse (short-circuit, recharge, forced discharge), which will lead to the activation of safety valves and/or the rupture of the battery container.
Any accidental release of the inner components of the cell, or their combustion products could be highly hazardous. Battery content exposition to air humidity/liquid water may be followed by severe battery vent/explosion/fire, depending on the hazard causes and circumstances.

Protection from charging:

Whenever lithium batteries are not the single power source in a circuit, the following measures recommended by Underwriters Laboratories are relevant. The cells should not be connected in series with an electrical power source that would increase the load through the cells. The electronic circuit shall include one of the following:

A. Two suitable diodes or the equivalent in series with the cells to prevent any reverse (charging) current. The second diode is used to provide protection in the event that one would fail. Quality control, or equivalent procedures, shall be established by the device manufacturer to check that the diode polarity is correct for each unit.

or

B. A blocking diode or the equivalent to prevent any reverse (charging) current and a resistor to limit current in case of diode failure. The resistor should be sized to limit the reverse (charging) current to the maximum value according to the data sheet of the cell.

3. COMPOSITION, INFORMATION OR INGREDIENTS

Each unit cell consists of a hermetically sealed metallic can containing a number of chemicals and materials of construction of which the following are potentially hazardous upon release to air.

Component	CAS Number	EINECS/ELINCS	Content (wt. %)*
Lithium metal	7439-93-2	231-102-5	2-6
Thionyl dichloride	7719-09-7	231-748-8	18-47
Aluminium chloride	7446-70-0	231-208-1	1-5
Gallium chloride	13450-90-3	236-610-0	0-2
Lithium chloride	7447-41-8	231-212-3	1-2
Carbon	1333-86-4	215-609-9	2-5
PTFE	9002-84-0	N/A	0-1
Stainless steel, Nickel and inert material	N/A	N/A	remainder

** Quantities may vary with cell model*

4. HANDLING AND STORAGE

IMPORTANT NOTICE: Lithium-thionyle chloride batteries are not rechargeable and should not be tentatively charged or recharged. Manufacturer's recommendations should be followed regarding maximum current and operating temperature range. Applying pressure or deforming the battery may lead to disassembly and cause eye, skin and throat irritation.

STORAGE: Store in a cool, regulated (preferably below 21°C and in any case below 30°C), dry and ventilated area, away from possible sources of heat, open flames, food and drink. Avoid exposure to direct sunlight for long periods. Temperatures above 100°C (or higher for High Temperatures cells and batteries such as the LSH20-150 cell- refer to individual data sheets for maximum temperatures) may cause leakage and rupture, and result in shortened battery service life. Keep proper clearance space between batteries and walls. Since short circuit can cause burn hazard, leakage or explosion hazard, keep batteries in original packaging until use and do not mix them.

HANDLING:

- Do not open the battery system.
- Do not crush or pierce the cells.
- Do not short (+) or (-) terminal with conductors.
- Do not reverse the polarity.
- Do not submit to excessive mechanical stress.
- Do not mix batteries of different types or mix new and old ones together.
- Do not use the unit without its electronic management system.
- Do not expose the unit to water or condensation.
- Do not directly heat, solder or throw into fire. Such unsuitable use can cause leakage or spout vaporized electrolyte fumes and may cause fire or explosion.

5. PHYSICAL AND CHEMICAL PROPERTIES

The lithium-thionyl chloride cell or battery described by this Battery Information Sheet is a sealed unit when offered for sale. It is a manufactured "article" and does not expose the user to hazardous chemicals when used in accordance with manufacturer specifications.

Appearance – Cylindrical shape
Odour – If leaking, gives off a pungent corrosive odour

Flash point – Not applicable	Flammability – Not applicable
Boiling Point – Not applicable	Melting Point – Not applicable
Vapor Pressure – Not applicable	Vapor Density – Not applicable
pH – Not applicable	Specific Gravity – Not applicable
Solubility (in water) – Not applicable	Solubility (other) – Not applicable

6. STABILITY AND REACTIVITY

The battery system is stable when handled and stored according to section 4.

MATERIALS TO AVOID: Oxidizing agents, bases, water. Avoid electrolyte contact with aluminium of zinc.

CONDITIONS TO AVOID: Do not heat above 100°C (or higher (150°C) for High Temperatures cells and batteries such as the LSH20-150 cell- refer to individual data sheets for maximum temperatures) or incinerate. Do not disassemble, crush, pierce, short, charge or recharge. Avoid mechanical or electrical abuse.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen (H_2) as well as lithium oxide (Li_2O) and lithium hydroxide (LiOH) dust are produced in case of reaction of lithium metal with water (hydrolysis).
Chlorine (Cl_2), sulfur dioxide (SO_2) and disulfur dioxide (S_2Cl_2) are produced in case of thermal decomposition of thionyl dichloride above 100°C. Hydrochloric acid (HCl) and sulfur dioxide (SO_2) are produced in case of reaction of thionyl dichloride with water at room temperature.

Hydrochloric acid (HCl) fumes, lithium oxide (Li_2O), lithium hydroxide (LiOH) and aluminium hydroxide ($Al(OH)_3$) dust are produced in case of reaction of lithium tetrachloroaluminate ($LiAlCl_4$) with water.

7. TOXICOLOGICAL INFORMATION

There is no risk, unless the battery ruptures. In the event of accidental exposure to internal contents, corrosive fumes will cause severe skin, eye and mucous membrane irritation. Medical conditions are generally aggravated by exposure to battery internal contents: eczema, skin allergies, lung injuries, asthma and other respiratory disorders may occur. Overexposure may cause symptoms of non-fibrotic lung injury and ingestion can cause tissue damage to throat and gastro-respiratory tract.

8. ECOLOGICAL INFORMATION

The batteries do not contain mercury, cadmium or other heavy metals.

Eco-toxicity	None known if used/disposed of correctly.
Mammalian affects	None known if used/disposed of correctly.
Bioaccumulation potential	None known if used/disposed of correctly.
Environmental fate	None known if used/disposed of correctly.

9. DISPOSAL CONSIDERATIONS

Batteries do not contain hazardous materials according to EC Directives 91/157/EEC, 93/86/EEC, and 2002/95/EC (RoHS) Directive). Battery recycling is either mandatory or recommended: The European Directive 2006/66/EC has been implemented by most EC member states.
Dispose of in accordance with local laws and regulations. Store material for disposal as indicated in Section 4. A disposal service is offered upon request by Tadiran Batteries.
Do not incinerate, or subject cells to temperatures in excess of 100°C (or 150°C for LSH20-150 cells and the battery packs assembled from them). Such abuse can result in loss of seal, electrolyte leakage and/or violent disassembly with risk of material projections.

10. TRANSPORTATION INFORMATION

Note: when manufacturing a new battery pack, one must assure that it has fulfilled the tests according to the UN Model Regulations, Manuel of Tests and Criteria, Part III, subsection 38.3.

10.1 United Nations Class

For the single cell batteries and multi-cell battery packs that are non-restricted to transport (non-assigned to the Miscellaneous Class 9), use lithium batteries inside label.

For the single cell batteries and multi-cell battery packs which are restricted to transport (assigned to 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 Numbers:	3090	LITHIUM METAL BATTERIES: Shipment of cells and batteries *in bulk*
	3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT: Cells and batteries *contained in equipment* or *packed with it*

Shipping name	LITHIUM METAL BATTERIES
Hazard Classification:	9 Depending on their lithium metal content, some single cells and small multi-cell battery packs may be non-assigned to Class 9. Refer to Transport Certificate.
Packaging:	Group II

10.2 International agreements

By Air International:	IATA/ICAO: UN 3090 or UN3091
By Sea International:	IMDG: UN 3090 or UN 3091
European road transportation:	ADR
European rail transportation:	RID

11. REGULATORY INFORMATION

Regulations specifically applicable to the product:

- ACGIH and OSHA: see exposure limits of the internal components of the battery in section 14.
- IATA/ICAO (air transportation): UN 3090 or UN 3091.
- IMDG (sea transportation) : UN 3090 or UN 3091.
- Transportation within the US-DOT, 49 Code of Federal Regulations
- UK regulatory references: Classified under CHIP.
- Battery Directive (2006/66/EC): see section 9

12. FIRST AID MEASURES (not anticipated under normal use)

12.1. Electrolyte contact

EYE CONTACT: Immediately flush with plenty of water for at least 15 minutes and get medical attention.

SKIN CONTACT: Remove contaminated clothing and immediately flush with plenty of water for at least 15 minutes. In severe cases, get medical attention.

INHALATION: Contents of an opened cell may cause respiratory tract and mucus membrane irritation. Remove from exposure, rest and keep warm. Immediately inhale Cortisone spray. In severe cases, track medical surveillance for 48 hours.

INGESTION: Wash out mouth thoroughly with water and give plenty of water to drink. Get medical attention.

FURTHER TREATMENT: All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or have breathed its vapours should be seen by a Doctor.

12.2. Lithium metal contact

EYE CONTACT: Immediately flush with large quantities of water for at least 15 minutes, with open eyelids, and get medical attention.

SKIN CONTACT: Remove particles of lithium from skin as quick as possible. Immediately flush with plenty of water for at least 15 minutes and get medical attention.

INHALATION/INGESTION: Contents of an opened cell may cause respiratory tract and mucus membrane irritation. Remove from exposure, rest and keep warm. Immediately inhale Cortisone spray. In severe cases, track medical surveillance for 48 hours.

13. FIRE FIGHTING MEASURES (not anticipated under normal use)

ESTINGUISHING MEDIA:

- During a fire with lithium batteries, using large amounts of cold water or water-based foam has some cooling effect and is effective to prevent fire expansion as long as the extent of the fire has not progressed to the point that the lithium metal they contain is exposed (as marked by appearance of deep red flames). Do not use warm or hot water.
- Lith-X Class D extinguishers are effective on fires involving only a few lithium batteries.
- Do not use CO_2 or Halon-type extinguishers.
- Do not use sand, dry powder or soda ash, graphite powder or fire blankets.
- **Use only class D metal extinguishers on raw lithium metal.**

SPECIAL FIRE FIGHTING PROCEDURES:

- Fire fighters should wear approved/certified positive pressure self-contained breathing apparatus.
- Full protective clothing is necessary to prevent potential body contact with electrolyte solution.
- During water spraying, caution is advised as burning pieces of lithium may be ejected from the fire.
- It is permissible to use any class of extinguishing medium, specified above, on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.
- If the cells or batteries are not located at the center of the fire, copious amounts of water may be supplied using a diffuser type nozzle so that the cells remain cool during the fire containment and extinction. A sprinkler system should be suitable for this purpose, the critical factor being that the lithium cells do not experience temperatures above the melting point of lithium (180°C).
- Small amounts of water should never be used such as the volumes contained within portable fire extinguishers. Standard dry powder extinguishers are ineffective. It should be kept in mind that a hazard of hydrogen formation exists whenever hot lithium metal comes into contact with water.

14. EXPOSURE CONTROLS AND PERSONAL PROTECTION* (not anticipated under normal use)

	**Respiratory protection**	In all fire situations, use self-contained breathing apparatus
	**Hand protection**	In case of leakage wear protective gloves
	**Eye protection**	Safety glasses are mandatory during handling
	**Other**	In the event of leakage or ruptured cells, wear a rubber apron and protective clothes.

**AFNOR pictograms*

Occupational exposure standard:

Compound	8 hour TWA	15 min TWA	SK
Sulfur Dioxide	1 ppm	1 ppm	-
Hydrogen chloride	1 ppm	5 ppm	-

15. ACCIDENTAL RELEASE MEASURES (not anticipated under normal use)

INDIVIDUAL PRECAUTIONS: Evacuate the employees from area until fumes dissipate. In case of electrolyte leakage from a cell or battery, do not inhale vapors or touch liquid with bare hands. In case of skin or eye contact, inhalation or ingestion, follow the measured described in section 12.

ENVIRONMENTAL PRECAUTION: Avoid sewage, surface water and underground water contamination. Avoid ground and atmosphere contamination.

WAYS OF CLEANING: With protective glasses and gloves, use absorbent material (sand, earth, chalk ($CaCO_3$) or lime (CaO) powder or Vermiculite) to absorb any exuded material. Seal leaking battery (unless hot) and contaminated absorbent material tight in plastic bag, and dispose of as hazardous waste in accordance with local regulations. Electrolyte traces may be wiped off dryly using household paper. Rinse with water afterwards.

16. OTHER INFORMATION

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, neither exhaustively nor perfect reliability can be granted. Information does not imply implicit or specific warranty of it.

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