



KONGSBERG

Safety Data Sheet

Safety information for transponder and transponder battery

This document includes transponder safety information for all the Kongsberg Maritime transponders with lithium battery and separate transponder lithium batteries. This document also includes emergency procedures.

Warning

This document must be read before handling transponders with lithium battery and separate transponder lithium batteries.

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About this document

Rev	Date	Written by	Checked by	Approved by
D	12.01.09	GM	SER	JEF
	Re-organized and re-written parts of the document.			

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Disclaimer

Kongsberg Maritime endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omission.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment. Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

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KONGSBERG

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1 IDENTIFICATION OF THE PRODUCTS AND COMPANY

1.1 Product name

All Kongsberg Maritime transponders with a lithium battery, and separate Kongsberg Maritime transponder lithium batteries.

1.2 Range of products

PART NUMBER	BATTERY TYPE
290-089501	L10/36 (15/20)
290-101665	L10/36 (18/30)
290-103053	L10/36 (15/40)
290-089505	L10/36 (36/60)
290-102726	L10/40 (3/11)
290-210845	L10/40 (3/11)
290-089010	L10/21 (6/12)
290-082380	L10/21 (6/48)
290-089592	L10/50 (12/42)
290-222071	L10/50 (27/28)
290-083530	L50/10/24
290-219492	L24 (98)
290-062447	L50
290-080718	L80
325902	L14.4 (48)
319554	D48-Li

1.3 Company address

Kongsberg Maritime AS
P.O.Box 111
N-3190 Horten
Norway

1.4 Emergency contact

Duty phone 24 hour: +47 992 03 808

2 COMPOSITION AND INFORMATION ON INGREDIENTS

2.1 Battery chemistry

A transponder lithium battery consists of **Lithium Metal** cells with chemistry:

Lithium Thionyl Chloride - Li/SOCl₂

- Negative electrode: Lithium metal (Li)
- Positive electrode: Carbon
- Electrolyte: Solution of lithium tetrachloroaluminate (LiAlCl₄) in thionyl chloride

2.2 Battery weight and lithium content

PART NUMBER	BATTERY TYPE	BATTERY WEIGHT (kg)	LITHIUM CONTENT (g)
290-089501	L10/36 (15/20)	4,3	175
290-101665	L10/36 (18/30)	5,6	240
290-103053	L10/36 (15/40)	6,6	235
290-089505	L10/36 (36/60)	11,7	480
290-102726	L10/40 (3/11)	1,7	70
290-210845	L10/40 (3/11)	1,7	70
290-089010	L10/21 (6/12)	2,2	90
290-082380	L10/21 (6/48)	6,7	270
290-089592	L10/50 (12/42)	6,5	228
290-222071	L10/50 (27/28)	6,6	247
290-083530	L50/10/24	10	438
290-219492	L24 (98)	11	490
290-062447	L50	4,3	175
290-080718	L80	6,8	280
325902	L14.4 (48)	5,9	183
319554	D48-Li	5,9	183

2.3 Battery cell manufacturers/types

A transponder lithium battery consists of cells from one or two of the following manufacturers and types:

- Tadiran TL-2300
- Sonnenschein SL-780
- Saft LS 33600
- Saft LSH 20
- Sonnenschein SL-760

2.4 Battery design

A transponder lithium battery consists of several battery cells that are electrical connected, both in serial and parallel.

There are transponder batteries with different number of cells, voltages and capacity.

All transponder batteries include protection against short-circuits (re-settable fuses) and reverse current (diodes).

3 HAZARDS IDENTIFICATION

Short-circuits, overheating, mechanical damage and exposure to water can start chemical reactions and high currents inside the transponder lithium battery. This can generate noxious gases and/or danger of explosions. The chemical reactions will continue without additional supply of oxygen, as the battery cells contain the necessary ingredients for maintaining the chemical reactions.

During operation, the battery is placed inside the transponder. Water ingress into the transponder can cause dangerous situations.

3.1 Danger of explosions

- If the cells that form the battery exceed the critical temperature of 180° C, they may explode.
- **External fire** - The temperature can reach the critical point of 180° C.
- **Water ingress** - The battery temperature will increase, caused by the high internal currents. The temperature can reach the critical point of 180° C.
- **Water ingress** - Electrolysis gives hydrogen. Together with oxygen, hydrogen can create oxyhydrogen gas inside the transponder (depends on the concentration). This gas is very inflammable/explosive.
- **Water ingress** - Chemical reactions in the battery will cause a pressure build-up inside the transponder. The transponder can explode if the inside pressure is high enough.
- If the transponder explodes, either the transducer or the bottom end cap will blow out, or the transponder becomes fragmented. This can cause serious damages on personnel and/or equipment.
- Some transponders have a relief valve that will prevent over-pressure. Noxious gases will then leak out of the transponder until the chemical reactions have stopped.

Note

The relief valve can be plugged, caused by products from the chemical reactions during an emergency as described above.

3.2 Noxious gases

- Thionyl chloride (SOCl₂)
- Sulphur dioxide (SO₂)
- Hydrogen chloride (HCl)
- Chlorine (Cl₂)

4 FIRST-AID MEASURES

All personnel that have been exposed to the noxious gases should immediately be seen by a doctor.

Inhalation:	Remove from exposure, rest and keep warm.
Skin contact:	Wash off skin thoroughly with water. Remove contaminated clothing and wash it before reuse.
Eye contact:	Irrigate thoroughly with water for at least 15 minutes.
Ingestion:	Wash out mouth thoroughly with water and give plenty of water to drink.

5 FIRE-FIGHTING MEASURES

- **Cool down the battery with copious amounts of cold water.**
 - Transponder with lithium battery:
 - * Immerse the transponder in the sea for 24 hours or permanent.
 - * If this method is impossible, the transponder can be cooled down by use of a fire hose.
 - Separate transponder lithium battery:
 - * Immerse the battery in the sea for 24 hours or permanent.
 - * If this method is impossible, the battery can be cooled down by use of a fire hose.

Cooling down the battery with copious amount of cold water is the only way to reduce/stop the internal chemical reactions, or to limit the fire/explosions to as few battery cells as possible. The chemical reactions/fire will continue without additional supply of oxygen, so extinguisher like Lith-X will not work properly.

Applying water directly onto a battery may develop hydrogen gas, due to the possible electrolysis if the battery terminals are exposed to water. Mixed with air, this gas is very inflammable/explosive. However, if the water cooling takes place out on deck, or in a storeroom with good ventilation, there will never be enough hydrogen gas to exceed the lower explosive limit of hydrogen in air (ca 4%).

- **Remove transponders with lithium battery and separate transponder lithium batteries in case of an external fire if possible.**

6 ACCIDENTAL RELEASE MEASURES

Refer to Chapter 7, *Handling and Storage*.

7 HANDLING AND STORAGE

All personnel that handle transponders must know the transponder's status:

'Functioning' - 'Failing' - 'Unknown'

A Transponder with unknown status, **must be handled** as a transponder that is failing.

7.1 Recovering a "*functioning*" transponder

- All transponders recovered from the sea, should be placed in a safe place out on deck and controlled for minimum 2 hours:
 - Look for outer damages that could involve a water leakage.
 - The transponder housing temperature must be checked to verify a possible temperature increase in the lithium battery.
- If everything is OK refer to Kongsberg Maritime transponder instruction manuals for normal procedures.

7.2 Recovering a "*failing*" transponder

- Handle as possible water ingress ion.
- Evacuate all unnecessary people.
- Recover the transponder with great precaution. Use a crane.
- No people should be near the transponder when it is lifted up on deck.
- Place the transponder in a safe place out on deck, shielded from people and vital equipment.
- Fasten the transponder in a crane, ready to lower it into the sea again.
- Control the transponder for minimum 2 hours:
 - Look for outer damages that could involve a water leakage.
 - The transponder housing temperature must be checked to verify a possible temperature increase in the lithium battery.

Failing and normal temperature:

- Take out the battery - see *Opening a transponder with defect/possible defect battery*.

Failing and increasing temperature:

- See *Handling a heated or self-heated transponder*.

7.3 Handling a heated or self-heated transponder

- Evacuate all unnecessary people.
- Fasten the transponder to a rope and immerse it in the sea for 24 hours or permanent.
 - If this method is impossible, the transponder can be cooled down with copious amount of cold water. Use a fire hose.
- Recover the transponder and control the temperature.
- Repeat this until the temperature is low and stable.
- The transponder can now be opened - see *Opening a transponder with defect/possible defect battery*.

7.4 Handling a transponder if relief valve opens

- Evacuate all unnecessary people.
- Use necessary protection equipment.
- Fasten the transponder to a rope and immerse it in the sea for 24 hours or permanent.
 - If this method is impossible, the transponder can be cooled down with copious amount of cold water.
 - Use a fire hose.
- Repeat this until no gases come out the check valve and the temperature is low and stable.
- The transponder can now be opened - see *Opening a transponder with defect/possible defect battery*.
- Wash out chemical reaction products with water.

7.5 Opening a transponder with defect/possible defect battery

- The transponder is reported failing. There could have been water ingress in the transponder.
- Open the transponder in a safe place out on deck, shielded from people and vital equipment.
- Use necessary protection equipment.

Caution

Do not stand in front of transducer or bottom end cap, when opening the transponder.

- If there has been water ingress, and the battery is still warm:
 - Disconnect the battery from the transponder electronics, and then - see *Handling heated or warm separate battery*.
- Wash out chemical reaction products with water.

7.6 Opening a "functioning" transponder

- The transponder is reported functioning.
- Open the transponder in a safe place out on deck, shielded from people and vital equipment.

Caution

Do not stand in front of transducer or bottom end cap, when opening the transponder.

Handling heated or warm separate battery

- Evacuate all unnecessary people.
- Fasten the battery to a rope and immerse it in the sea for 24 hours or permanent.
 - If this method is impossible, the battery can be cooled down with copious amount of cold water.
 - Use a fire hose.
- Wash out chemical reaction products with water.

7.7 Handling transponders and separate transponder batteries in case of an external fire

- Remove transponders with lithium battery and separate transponder lithium batteries in case of an external fire if possible
- Cool down transponders and separate transponder batteries with copious amounts of cold water - see Chapter 5, *Fire-fighting measures* on page 9.

7.8 Storage

Caution *A transponder that is failing must be stored in a safe place out on deck, shielded from people and vital equipment.*

A transponder that is functioning, and separate batteries can be stored indoors. The battery must be removed from the transponder when stored indoors.

- Storage temperature:
 - Recommended storage temperature lies between 0° C and +25° C (max +50° C, min -55° C).
- Storage relative air humidity:
 - Recommended relative air humidity is 40 to 70%.
- A transponder/separate battery must not be stored directly in the sunlight.
- A battery must not be exposed to water.
- Storeroom:
 - A solid room with study racks for transponders/separate batteries.
 - A room where no people are staying, or no vital equipment is placed.
 - Good ventilation.
 - Clearly identified.
 - Easy to remove transponders and batteries in case of an external fire.

Caution *The storeroom must have a sprinkler system or a fire station, with fire hose (water), must be placed outside the storeroom.*

8 EXPOSURE CONTROLS AND PERSONALS PROTECTION

Fire/explosion:

- Use self contained breathing apparatus.

Relief valve opens and noxious gasses come out:

- Use a full face mask with minimum BE-filter, and protective equipment of rubber or plastic.

Opening transponder with defect/possible defect battery:

- Use a full face mask with minimum BE-filter, and protective equipment of rubber or plastic.

Opening a functioning transponder:

- Use protective goggles.

9 PHYSICAL AND CHEMICAL PROPERTIES

Not applicable unless individual components exposed.

10 STABILITY AND REACTIVITY

The products are stable under normal conditions - see Chapter 3, *Hazards identifications* on page 7.

11 TOXICOLOGICAL INFORMATION

Signs and symptoms:

- None, unless battery ruptures. In the event of exposure to internal contents, corrosive fumes with pungent odour will be very irritating to skin, eyes and mucous membranes. Over-exposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Inhalation:	Lung irritant.
Skin contact:	Skin irritant.
Eye contact:	Eye irritant.
Ingestion:	Tissue damage to throat and gastro/respiratory tract if swallowed.
Medical conditions:	Eczema, skin allergies, lung injuries, asthma and other respiratory disorders may occur.

12 ECOLOGICAL INFORMATION

None known if used/disposed of correctly.

13 DISPOSAL CONSIDERATIONS

- A lithium thionyl chloride battery does not contain any heavy metals, and is therefore not regarded as special waste (contains only biodegradable parts).
- A used transponder lithium battery often contains a significant amount of residual energy. It is the danger of explosion that presents a problem when disposing a battery.
 - Used batteries must therefore be handled with the same care as new ones.

Caution

For safe disposal, contact the nearest local company that has been approved to collect and dispose lithium batteries.

14 TRANSPORT INFORMATION

All transponders with a lithium battery and separate transponder lithium batteries must be shipped in accordance with the prevailing national regulations.

Transponder with lithium battery:

UN no. 3091, Class 9 Miscellaneous
(Lithium batteries contained in equipment).

Separate transponder lithium battery:

UN no. 3090, Class 9 Miscellaneous (Lithium batteries)

Transport:

Aircraft:	IATA DGR
Sea Transport:	IMDG Code
Railway:	RID
Road transport:	ADR

- Aircraft - Only new separate transponder lithium batteries can be transported by air.
- Aircraft - Transport of all transponders with new lithium battery and new separate transponder lithium batteries by air is only permitted onboard cargo aircraft. The goods must be clearly labelled:

CARGO AIRCRAFT ONLY

Caution

Transponder with lithium battery - During transport the lithium battery must always be disconnected from the electronics.

- Original transponder/battery cages must be used.

15 REGULATORY INFORMATION

Not applicable.

16 OTHER INFORMATION

The battery cell manufacturers' safety data sheets are available on the following internet addresses:

- Saft: Saft: www.saftbatteries.com
- Tadiran / Sonnenschein: www.tadiranbatteries.de