Lithium Battery Summary

SEA AND ROAD FREIGHT COMPLIANCE SUMMARY

Reference: IMDG code 2020 and the ADG 7.7

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UN3536 Lithium Batteries installed in Cargo Transport Units must comply with SP389

Refer to IMDG or ADG for definition of Lithium Ion & Metal Batteries

Note: All lithium cells and batteries must be of a design tested in accordance with UN Manual of Tests and Criteria, part III, subsection 38.3, with the exception for small production run and prototype batteries transported in accordance with Packing Instruction P910 or non -conforming batteries transported in accordance with P908 or P909.

Please remember: Commercial shippers of Lithium batteries are required to be trained under the AMSA Marine Orders 41.

AIRSAFE Transport Training
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Applies to batteries (undamaged)

UN3480 - Lithium Ion Batteries **UN3090 - Lithium Metal Batteries**	**FULLY DECLARED DG** **(Packing Instruction P903or LP903)**	**Not subject to all aspects of the IMDG & ADG** **(Special provision 188)**
Applicable to:  Cell (Single unit)  Battery (Multiple cells connected) Note: Single cell batteries, e.g. cell phone batter-	Ion Batteries **over 100 Watts** per hour (W/h) and Metal Batteries **over 2 grams** of Li metal Ion Cells **over 20 W/h** and Metal Cells **over 1 gram** of Li metal	Ion Batteries no more than 100 W/h and Metal Batteries under 2 grams of Li metal Ion Cells no more than 20 W/h and Metal Cells under 1 gram of Li metal
Packaging and marking requirements	Protect against short circuit, arcing, and damage that may occur through placement of the batteries in the package or movement during transport. Inner packages must completely enclose Cell/Battery • UN Specification package to a PG II standard; or • For individual batteries with a gross mass of 12 kg or more in a strong impact resistant outer casing packaging: strong outer packaging; protective enclosures; or pallets and handling devices ***Marking required on packages:*** UN number, proper shipping name **UN3480 Lithium ion batteries**; or **UN3090 Lithium metal batteries**	Strong Rigid outer packaging Inner packages must completely enclose Cell/Battery Protection against short circuit or arcing ***Marking required on packages:*** ***See below under "label required".***
Quantity allowed	Within the UN package tested limits.	Maximum of 30 kg Gross mass per package.
Label required	**Class 9 lithium battery hazard label** 	 **Handling mark/ label** The label must include: - the UN number; and - Emergency contact telephone number.
Shippers Declaration / Multi-Modal Form required	YES, see example on last page	NO

Applies to equipment with batteries (undamaged)

UN3481 - Lithium Ion Batteries packed with equipment **UN3091 - Lithium Metal Batteries packed with equipment**	**FULLY DECLARED DG (Packing Instruction P903 or LP903)**	**Not subject to all aspects of the IMDG & ADG (Special provision 188)**
Applicable to: ***Note: this information relates to equipment and the batteries required to power that equipment.***	Ion Batteries **over 100 Watts** per hour (W/h) and Metal batteries **over 2 grams** of Li metal Ion Cells **over 20 W/h** and Metal Cells **over 1 gram** of Li metal	Ion Batteries no more than 100 W/h and Metal Batteries no more than 2 grams of Li metal Ion Cells no more than 20 W/h and Metal Cells no more than 1 gram of Li metal
Packaging and marking requirements	Either: • PG II standard UN Specification package around the batteries, then placed in strong outer packaging with the equipment,; or • Inner packages that completely enclose the cells or batteries, placed with the equipment into a PG II standard UN Specification package. Inner packages must completely enclose Cell/Battery. Protect against short circuit, arcing and movement during transport . ***Marking required on packages:*** UN number and proper shipping name **UN3481 Lithium ion batteries packed with equipment**; or **UN3091 Lithium metal batteries packed with equipment**	Strong outer packaging. Inner packages must completely enclose Cell/Battery Protection against short circuit or arcing. ***Marking required on packages:*** ***See below under "label required".***
Quantity allowed	No specified limit	No specified limit
Label required	**Class 9 lithium battery hazard label**  	 **Handling mark/ label** The label must include: - the UN number; and - Emergency contact telephone number.
Shippers Declaration / Multi-Modal Form required	YES, see example on last page	NO

Applies to equipment containing batteries (undamaged)

UN3481 - Lithium Ion Batteries contained in equipment **UN3091 - Lithium Metal Batteries contained in equipment**	**FULLY DECLARED DG** **(Packing Instruction P903 or LP903)**	**Not subject to all aspects of the IMDG & ADG** **(Special provision 188)**
Applicable to: ***Note: this information relates to the batteries required to power the equipment.***	Ion Batteries **over 100 Watts** per hour (W/h) and Metal batteries **over 2 grams** of Li metal Ion Cells **over 20 W/h** and Metal Cells **over 1 gram** of Li metal	Ion Batteries no more than 100 W/h and Metal Batteries no more than 2 grams of Li metal Ion Cells no more than 20 W/h and Metal Batteries no more than 1 gram of Li metal
Packaging and marking requirements	Strong outer packaging of adequate strength and design for it's intended use (UN specification packaging not required); or For large equipment that provides the equivalent protection, the equipment may be unpackaged or on pallets Protect against short circuit, arcing or accidental activation. ***Marking required on packages:*** UN number and proper shipping name: **UN3481 Lithium ion batteries contained in equipment**; or **UN3091 Lithium metal batteries contained in equipment**	Strong Outer packaging or equipment that offers equivalent protection to packaging. Protection against short circuit, arcing or activation ***Marking required on packages:*** ***See below under "label required".***
Quantity allowed	No specified limit	No specified limit
Label required	**Class 9 lithium battery hazard label**  	 **Handling mark/ label** The label must include: - the UN number; and - Emergency contact telephone number. ***Note:*** *The label is not required when packages contain only button cell batteries installed in equipment (including circuit boards); also consignments of no more that 2 packages where each package contains no more than 2 batteries for 4 cells installed in equipment*
Shippers Declaration / Multi-Modal Form required	YES, see example on last page	NO

Applies to damaged or defective batteries

UN3480 - Lithium Ion Batteries **UN3481 - Lithium Ion Batteries packed with Equipment** **UN3481 - Lithium Ion Batteries contained in Equipment** **UN3090 - Lithium Metal Batteries** **UN3091 - Lithium Metal Batteries packed with Equipment** **UN3091 - Lithium Metal Batteries contained in Equipment**	**FULLY DECLARED DG** **(Packing Instruction P908 or LP904 & SP376)** **(If liable to emit toxic, corrosive or flammable gasses or vapours, evolve flames or heat or rapidly disassemble must be transported under P911 or LP906)** ***Note:*** SP 188 does not apply to damaged or defective batteries.
Applicable to:	**All sizes of cells or batteries (including those contained in equipment) that:** **- are defective for safety reasons;** **- have leaked or vented;** **- cannot be diagnosed prior to transport; or** **- have sustained physical or mechanical damage**
Packaging and marking requirements	UN Specification package to a PG II Standard as specified in Packing Instructions P908 or LP904 In addition: • Each battery, cell or piece of equipment must be individually packed in inner packages and placed into an approved outer. The inner or outer package must be leak-proof to prevent potential leakage; • Each inner package must be surrounded by sufficient non-combustible, non-conductive thermal insulation to protect against a dangerous evolution of heat; and • Leaking cells or batteries must have sufficient inert absorbent material added to inner or outer packagings to absorb the release of electrolyte. ***Marking required on packages****:* • UN number and proper shipping name (see top left corner of page) • "**DAMAGED/DEFECTIVE LITHIUM ION BATTERIES**" or "**DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES**" as applicable.
Quantity allowed	Within the UN package tested limits. ***Note:*** Batteries with a net mass of more than 30 kg are limited to one per outer package.
Label required	**Class 9 lithium battery hazard label** 
Shippers Declaration / Multi-Modal Form required	YES, see example on last page, the applicable entry must also include the statement "Transport in accordance with special provision 376"

Applies to recycled batteries or batteries transported for disposal

UN3480 - Lithium Ion Batteries **UN3481 - Lithium Ion Batteries packed with Equipment** **UN3481 - Lithium Ion Batteries contained in Equipment** **UN3090 - Lithium Metal Batteries** **UN3091 - Lithium Metal Batteries packed with Equipment** **UN3091 - Lithium Metal Batteries contained in Equipment**	**FULLY DECLARED DG** **(Packing Instruction P909 & SP377)** ***Note:*** SP 188 does not apply to recycled batteries or batteries transported for disposal.
Applicable to:	**Cells or batteries (including those contained in equipment) being sent for disposal or recycling but that are not defective** **Defective or damaged batteries must be sent under Packing Instruction 908 & SP376**
Packaging and marking requirements	Each battery, cell or piece of equipment must be packed to prevent short circuit and dangerous evolution of heat (See Packing Instruction 909 Additional requirements). UN Specification package to PG II Standard as specified in Packing Instruction 909. Except for: • Li ion batteries 100 W/H or less, Li ion cells 20 W/H or less, Li metal batteries 2 grams or less, and Li metal cells 1 gram or less, when in strong outer packaging with a gross mass of 30 kg or less; • Individual batteries with a gross mass of 12 kg or more with a strong impact resistant outer casing do not require UN specification packaging when packed in an outer package of adequate strength and design related to it's intended use; and • Batteries or cells contained in equipment in outer packaging of adequate strength and design for it's intended use; large equipment unpackaged or secured on pallets if equivalent protection is provided for the battery by the equipment itself. ***Markings required on packages:*** • UN number and proper shipping name (see top left corner of page) • "**LITHIUM BATTERIES FOR DISPOSAL**" or "**LITHIUM BATTERIES FOR RECYCLING**" as applicable.
Quantity allowed	Within the UN package tested limits or as excepted in packaging requirements above.
Label required	**Class 9 lithium battery hazard label** 
Shippers Declaration / Multi-Modal Form required	YES, see example on last page, the applicable entry must also include the statement "Transport in accordance with special provision 377"

Applies to small production run (100 or less) cells and batteries, or pre-production prototype batteries

UN3480 - Lithium Ion Batteries **UN3481 - Lithium Ion Batteries packed with Equipment** **UN3481 - Lithium Ion Batteries contained in Equipment** **UN3090 - Lithium Metal Batteries** **UN3091 - Lithium Metal Batteries packed with Equipment** **UN3091 - Lithium Metal Batteries contained in Equipment**	**FULLY DECLARED DG** **(Packing Instruction P910 or LP905 & SP310)** ***Note:*** SP 188 does not apply to small production run and pre-production prototype batteries.
Applicable to:	**Untested cells or batteries (including those contained in or packed with equipment)**
Packaging and marking requirements	Each battery, cell or piece of equipment must be packed to prevent short circuit and dangerous evolution of heat (See Packing Instruction 910 Additional requirements). UN Specification package to PG II Standard as specified in Packing Instruction 910. • Cells and batteries packed with equipment must be individually packed in inner packaging and placed inside an outer packaging of a type listed in PI910 • Each inner package shall be completely surrounded by sufficient non-combustible and non-conductive thermal insulation material to protect against a dangerous evolution of heat and appropriate measures taken to minimise effects of vibration, shocks and movement of the cells or batteries to prevent damage • For cells or batteries contained in equipment the equipment shall be constructed or packaged in such a manner as to prevent accidental operation during transport • The equipment or the batteries may be transported unpackaged under conditions specified by the competent authority. Additional conditions may be considered in the approval process ***Marking required on packages:*** • UN number and proper shipping name (see top left corner of page)
Quantity allowed	Within the UN package specification test limits or if a cell or battery has a net mass of 30kg or more, a limit of 1 cell or battery per package. ***(Does not apply to Batteries or Cells contained in equipment)***.
Label required	**Class 9 lithium battery hazard label** 
Shippers Declaration / Multi-Modal Form required	YES, see example on last page, the applicable entry must also include the statement “Transport in accordance with special provision 310”

14. Shipping marks	No. and kind of packages; description of goods*		Gross Mass (kg)	Net Mass (kg)	Cube (m^3)
	UN3480 Lithium ion batteries 9 5 boxes x 20 kg EmS: F-A, S-I			100 kg	
	UN3090 Lithium metal batteries 9 5 boxes x 20 kg EmS: F-A, S-I			100 kg	
	UN3481 Lithium ion batteries packed with equipment 9 10 boxes x 10 kg EmS: F-A, S-I			100 kg	
	UN3091 Lithium metal batteries packed with equipment 9 10 boxes x 10 kg EmS: F-A, S-I			100 kg	
	UN3481 Lithium ion batteries contained in equipment 9 10 boxes x 10 kg EmS: F-A, S-I			100 kg	
	UN3091 Lithium metal batteries contained in equipment 9 10 boxes x 10 kg EmS: F-A, S-I *Note: The number of packages and quantity are variables that will change shipment by shipment*			100 kg	

Note: "**Transport in accordance with special provision 376**" must be included when transporting damaged or defective batteries.

"**Transport in accordance with special provision 377**" must be included when transporting batteries for disposal or recycling.

"**Transport in accordance with special provision 310**" must be included when transporting small production run and pre-production prototype batteries.

Information relating to the new lithium battery labels:

Class 9 lithium battery hazard label must be used for larger batteries which require a multi-modal form.

- The miscellaneous hazard label must not be used after 31 December 2018
- The li-batt label is mandatory as of 1st January 2019.
- The li-batt label must NOT display the word 'miscellaneous' on the label.
- CTU's containing section I lithium batteries, must be placarded with the class 9 Miscellaneous goods placard. As per SP 384

Lithium battery handling mark label must be used for smaller batteries complying to Special Provision 188

- The li-batt handling mark/label is mandatory as of 1st January 2019.
- On the label * replace with UN number and ** replace with Contact number
- The statement below is not applicable after 31 December 2019.
- As of 01 Jan 21, the minimum label size is 100 mm x 100 mm, however the height of the label can be reduced to 70 mm if required to fit on the package.

Additional Information To calculate watts per hour for Lithium ion: Ah (Amperes per hour) x V (Volt) = Wh