

# Lithium & Sodium Ion Battery Summary

## SEA AND ROAD FREIGHT COMPLIANCE SUMMARY

*Reference: IMDG code 2024 and the ADG 7.8*

UN 3480 Lithium Ion Batteries	Page 2
UN 3090 Lithium Metal Batteries	Page 2
UN 3551 Sodium Ion Batteries	Page 2
UN 3481 Lithium Ion Batteries packed with equipment	Page 3
UN 3091 Lithium Metal Batteries packed with equipment	Page 3
UN 3552 Sodium Ion Batteries packed with equipment	Page 3
UN 3481 Lithium Ion Batteries contained in equipment	Page 4
UN 3091 Lithium Metal Batteries contained in equipment	Page 4
UN 3552 Sodium Ion Batteries contained in equipment	Page 4
Damaged or defective lithium batteries (all forms)	Page 5
Recycling or disposal of Lithium batteries (all forms)	Page 6
Small Production runs or pre-production lithium batteries (all forms - not tested to UN 38.3)	Page 7

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

UN3556 Vehicle, lithium ion battery powered, UN3557, Vehicle, lithium metal battery powered and UN3558, Vehicle, sodium ion battery powered, please refer to the Transporting vehicles by sea summary sheet.

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



*AIRSAFE Transport  
Training*  
www.airsafe.com.au







*AIRSAFE Transport  
Training*  
www.airsafe.com.au

**Note:** All lithium and sodium ion 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 / Sodium ion batteries are required to be trained under the AMSA Marine Orders 41.

Disclaimer: The intention of this document is not to replace the IMDG, AMSA or ADG regulations. It is merely to aid with the interpretation of the IMDG2024 and ADG7.8 Lithium and Sodium ion battery requirements. No user should act on such information without reference to applicable Regulations. Every effort has been made to present accurate, current information but **AIRSAFE** shall not be held responsible for loss, damage or legal action due to errors or omissions, misprints or misinterpretation of the contents.



## Applies to batteries (undamaged)

<p><b>UN3480 - Lithium Ion Batteries</b>  <b>UN3090 - Lithium Metal Batteries</b>  <b>UN 3551 - Sodium Ion Batteries</b></p>	<p><b>FULLY DECLARED DG</b>  <b>(Packing Instruction P903 or LP903)</b></p>	<p><b>Not subject to all aspects of the IMDG &amp; ADG</b>  <b>(Special provision 188)</b></p>
<p><b>Applicable to:</b></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">               Cell              (Single unit)         </div> <div style="text-align: center;">               Battery              (Multiple cells connected)         </div> </div> <p>Note: Single cell batteries, e.g. cell phone batteries, are considered cells.</p>	<p>Li Ion or Sodium Ion Batteries <b>over 100 Watts</b> per hour (W/h) and              Li Metal Batteries <b>over 2 grams</b> of Li metal</p> <p>Li Ion or Sodium Ion Cells <b>over 20 W/h</b> and              Li Metal Cells <b>over 1 gram</b> of Li metal</p>	<p>Li Ion or Sodium Ion Batteries no more than 100 W/h and              Li Metal Batteries under 2 grams of Li metal</p> <p>Li Ion or Sodium Cells no more than 20 W/h and              Li Metal Cells under 1 gram of Li metal</p>
<p><b>Packaging and marking requirements</b></p>	<p>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</p> <ul style="list-style-type: none"> <li>• UN Specification package to a PG II standard; or</li> <li>• 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</li> </ul> <p><b>Marking required on packages:</b>              UN number, proper shipping name  <b>UN3480 Lithium ion batteries</b> or  <b>UN3090 Lithium metal batteries</b> or  <b>UN3551 Sodium ion batteries</b></p>	<p style="text-align: center;">Strong Rigid outer packaging              Inner packages must completely enclose Cell/Battery              Protection against short circuit or arcing</p> <p style="text-align: center;"><b>Marking required on packages:</b>  <b>See below under “label required”.</b></p>
<p><b>Quantity allowed</b></p>	<p>Within the UN package tested limits.</p>	<p>Maximum of 30 kg Gross mass per package.</p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium Ion battery hazard label</b></p> 	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Battery Handling mark/ label</b>                      The label must include:                      - the UN number</p> </div> </div>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p>YES, see example on last page</p>	<p>NO</p>


## Applies to equipment with batteries (undamaged)

<p><b>UN3481 - Lithium Ion Batteries packed with equipment</b></p> <p><b>UN3091 - Lithium Metal Batteries packed with equipment</b></p> <p><b>UN3552 - Sodium Ion Batteries packed with equipment</b></p>	<p><b>FULLY DECLARED DG</b> <b>(Packing Instruction P903 or LP903)</b></p>	<p><b>Not subject to all aspects of the IMDG &amp; ADG</b> <b>(Special provision 188)</b></p>
<p><b>Applicable to:</b></p> <p><i>Note: this information relates to equipment and the batteries required to power that equipment.</i></p>	<p>Li Ion or Sodium Ion Batteries <b>over 100 Watts</b> per hour (W/h) and Li Metal Batteries <b>over 2 grams</b> of Li metal</p> <p>Li Ion or Sodium Ion Cells <b>over 20 W/h</b> and Li Metal Cells <b>over 1 gram</b> of Li metal</p>	<p>Li Ion or Sodium Ion Batteries no more than 100 W/h and Li Metal Batteries under 2 grams of Li metal</p> <p>Li Ion or Sodium Cells no more than 20 W/h and Li Metal Cells under 1 gram of Li metal</p>
<p><b>Packaging and marking requirements</b></p>	<p>Either:</p> <ul style="list-style-type: none"> <li>PG II standard UN Specification package around the batteries, then placed in strong outer packaging with the equipment,; or</li> <li>Inner packages that completely enclose the cells or batteries, placed with the equipment into a PG II standard UN Specification package.</li> </ul> <p>Inner packages must completely enclose Cell/Battery. Protect against short circuit, arcing and movement during transport .</p> <p><b>Marking required on packages:</b> UN number and proper shipping name <b>UN3481 Lithium ion batteries packed with equipment;</b> or <b>UN3091 Lithium metal batteries packed with equipment</b> or <b>UN3552 Sodium ion batteries packed with equipment</b></p>	<p style="text-align: center;">Strong outer packaging. Inner packages must completely enclose Cell/Battery</p> <p style="text-align: center;">Protection against short circuit or arcing.</p> <p style="text-align: center;"><b>Marking required on packages:</b> <b>See below under “label required”.</b></p>
<p><b>Quantity allowed</b></p>	<p>No specified limit</p>	<p>No specified limit</p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium Ion battery hazard label</b></p> 	 <p><b>Handling mark/ label</b> The label must include: - the UN number</p>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p>YES, see example on last page</p>	<p>NO</p>


## Applies to equipment containing batteries (undamaged)

<p><b>UN3481 - Lithium Ion Batteries contained in equipment</b></p> <p><b>UN3091 - Lithium Metal Batteries contained in equipment</b></p> <p><b>UN3552 - Sodium Ion Batteries contained in equipment</b></p>	<p><b>FULLY DECLARED DG</b> <b>(Packing Instruction P903 or LP903)</b></p>	<p><b>Not subject to all aspects of the IMDG &amp; ADG</b> <b>(Special provision 188)</b></p>
<p><b>Applicable to:</b></p> <p><i>Note: this information relates to the batteries required to power the equipment.</i></p>	<p>Li Ion or Sodium Ion Batteries <b>over 100 Watts</b> per hour (W/h) and Li Metal Batteries <b>over 2 grams</b> of Li metal</p> <p>Li Ion or Sodium Ion Cells <b>over 20 W/h</b> and Li Metal Cells <b>over 1 gram</b> of Li metal</p>	<p>Li Ion or Sodium Ion Batteries no more than 100 W/h and Li Metal Batteries under 2 grams of Li metal</p> <p>Li Ion or Sodium Cells no more than 20 W/h and Li Metal Cells under 1 gram of Li metal</p>
<p><b>Packaging and marking requirements</b></p>	<p>Strong outer packaging of adequate strength and design for it's intended use (UN specification packaging not required); or</p> <p>For large equipment that provides the equivalent protection, the equipment may be unpackaged or on pallets</p> <p>Protect against short circuit, arcing or accidental activation.</p> <p><b>Marking required on packages:</b> UN number and proper shipping name: <b>UN3481 Lithium ion batteries contained in equipment;</b> or <b>UN3091 Lithium metal batteries contained in equipment</b> or <b>UN3552 Sodium ion batteries contained in equipment</b></p>	<p>Strong Outer packaging or equipment that offers equivalent protection to packaging.</p> <p>Protection against short circuit, arcing or activation</p> <p style="text-align: center;"><b>Marking required on packages:</b> <b>See below under "label required".</b></p>
<p><b>Quantity allowed</b></p>	<p>No specified limit</p>	<p>No specified limit</p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium Ion battery hazard label</b></p> 	<div style="display: flex; align-items: center;">  <div style="margin-left: 10px;"> <p><b>Handling mark/ label</b></p> <p>The label must include:</p> <ul style="list-style-type: none"> <li>- the UN number;</li> </ul> </div> </div> <p><i>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</i></p>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p>YES, see example on last page</p>	<p>NO</p>


## Applies to damaged or defective batteries

<p style="text-align: center;"><b>UN3480 - Lithium Ion Batteries</b></p> <p><b>UN3481 - Lithium Ion Batteries packed with Equipment</b></p> <p><b>UN3481 - Lithium Ion Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3090 - Lithium Metal Batteries</b></p> <p><b>UN3091 - Lithium Metal Batteries packed with Equipment</b></p> <p><b>UN3091 - Lithium Metal Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3551 - Sodium Ion Batteries</b></p> <p><b>UN3552 - Sodium Ion Batteries packed with equipment</b></p> <p><b>UN3552 - Sodium Ion Batteries contained in equipment</b></p>	<p style="text-align: center;"><b>FULLY DECLARED DG</b> <b>(Packing Instruction P908 or LP904 &amp; SP376)</b></p> <p style="text-align: center;"><b>(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)</b></p> <p style="text-align: center;"><i>Note:</i> SP 188 does not apply to damaged or defective batteries.</p>
<p>Applicable to:</p>	<p style="text-align: center;"><b>All sizes of cells or batteries (including those contained in equipment) that:</b></p> <ul style="list-style-type: none"> <li>- are defective for safety reasons;</li> <li>- have leaked or vented;</li> <li>- cannot be diagnosed prior to transport; or</li> <li>- have sustained physical or mechanical damage</li> </ul>
<p><b>Packaging and marking requirements</b></p>	<p>UN Specification package to a PG II Standard as specified in Packing Instructions P908 or LP904</p> <p>In addition:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• Each inner package must be surrounded by sufficient non-combustible, non-conductive thermal insulation to protect against a dangerous evolution of heat; and</li> <li>• Leaking cells or batteries must have sufficient inert absorbent material added to inner or outer packagings to absorb the release of electrolyte.</li> </ul> <p><b>Marking required on packages:</b></p> <ul style="list-style-type: none"> <li>• UN number and proper shipping name (see top left corner of page)</li> <li>• <b>“DAMAGED/DEFECTIVE LITHIUM ION BATTERIES”</b> or <b>“DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES”</b> or <b>“DAMAGED/DEFECTIVE SODIUM ION BATTERIES”</b> as applicable.</li> </ul>
<p><b>Quantity allowed</b></p>	<p>Within the UN package tested limits.</p> <p><b>Note:</b> Batteries with a net mass of more than 30 kg are limited to one per outer package.</p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium ion battery hazard label</b></p> <div style="text-align: right;">  </div>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p style="text-align: center;">YES, see example on last page, the applicable entry must also include the statement “Transport in accordance with special provision 376”</p>

## Applies to recycled batteries or batteries transported for disposal

<p style="text-align: center;"><b>UN3480 - Lithium Ion Batteries</b></p> <p><b>UN3481 - Lithium Ion Batteries packed with Equipment</b></p> <p><b>UN3481 - Lithium Ion Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3090 - Lithium Metal Batteries</b></p> <p><b>UN3091 - Lithium Metal Batteries packed with Equipment</b></p> <p><b>UN3091 - Lithium Metal Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3551 - Sodium Ion Batteries</b></p> <p><b>UN3552 - Sodium Ion Batteries packed with equipment</b></p>	<p><b>FULLY DECLARED DG</b> <b>(Packing Instruction P909 &amp; SP377)</b></p> <p><i>Note:</i> SP 188 does not apply to recycled batteries or batteries transported for disposal.</p>
<p><b>Applicable to:</b></p>	<p><b>Cells or batteries (including those contained in equipment) being sent for disposal or recycling but that are not defective</b></p> <p><b>Defective or damaged batteries must be sent under Packing Instruction 908 &amp; SP376</b></p>
<p><b>Packaging and marking requirements</b></p>	<p>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).</p> <p>UN Specification package to PG II Standard as specified in Packing Instruction 909. Except for:</p> <ul style="list-style-type: none"> <li>• 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;</li> <li>• 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</li> <li>• 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.</li> </ul> <p><b>Markings required on packages:</b></p> <ul style="list-style-type: none"> <li>• UN number and proper shipping name (see top left corner of page)</li> <li>• "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" or "SODIUM BATTERIES FOR DISPOSAL" or "SODIUM BATTERIES FOR RECYCLING" as applicable.</li> </ul>
<p><b>Quantity allowed</b></p>	<p>Within the UN package tested limits or as excepted in packaging requirements above.</p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium ion battery hazard label</b></p> <div style="text-align: center;">  </div>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p>YES, see example on last page, the applicable entry must also include the statement "Transport in accordance with special provision 377"</p>

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

<p style="text-align: center;"><b>UN3480 - Lithium Ion Batteries</b></p> <p><b>UN3481 - Lithium Ion Batteries packed with Equipment</b></p> <p><b>UN3481 - Lithium Ion Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3090 - Lithium Metal Batteries</b></p> <p><b>UN3091 - Lithium Metal Batteries packed with Equipment</b></p> <p><b>UN3091 - Lithium Metal Batteries contained in Equipment</b></p> <p style="text-align: center;"><b>UN3551 - Sodium Ion Batteries</b></p> <p><b>UN3552 - Sodium Ion Batteries packed with equipment</b></p>	<p><b>FULLY DECLARED DG</b>  <b>(Packing Instruction P910 or LP905 &amp; SP310)</b></p> <p><i>Note:</i> SP 188 does not apply to small production run and pre-production prototype batteries.</p>
<p><b>Applicable to:</b></p>	<p><b>Untested cells or batteries (including those contained in or packed with equipment)</b></p>
<p><b>Packaging and marking requirements</b></p>	<p>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).</p> <p>UN Specification package to PG II Standard as specified in Packing Instruction 910.</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• 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</li> <li>• 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</li> <li>• 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</li> </ul> <p><b>Marking required on packages:</b></p> <ul style="list-style-type: none"> <li>• UN number and proper shipping name (see top left corner of page)</li> </ul>
<p><b>Quantity allowed</b></p>	<p>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. <b>(Does not apply to Batteries or Cells contained in equipment).</b></p>
<p><b>Label required</b></p>	<p><b>Class 9 Lithium &amp; Sodium ion battery hazard label</b></p> <div style="text-align: right;">  </div>
<p><b>Shippers Declaration / Multi-Modal Form required</b></p>	<p>YES, see example on last page, the applicable entry must also include the statement "Transport in accordance with special provision 310"</p>



14 Shipping marks	Number and kind of packages, description of goods	Gross mass (kg)	Net mass (kg)	Cube (m <sup>3</sup> )
	<b>UN3480 Lithium ion batteries 9</b> 5 boxes 20kg EmS: F-A, S-I or		100 kg	
	<b>UN3090 Lithium metal batteries 9</b> 5 boxes 20kg EmS: F-A, S-I or		100 kg	
	<b>UN3481 Lithium ion batteries packed with equipment 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3481 Lithium ion batteries contained in equipment 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3090 Lithium metal batteries 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3091 Lithium metal batteries packed with equipment 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3091 Lithium metal batteries contained in equipment 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3551 Sodium ion batteries 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3552 Sodium ion batteries packed with equipment 9</b> 10 boxes 10kg EmS: F-A, S-I or		100 kg	
	<b>UN3552 Sodium ion batteries contained in equipment 9</b> 10 boxes 10kg EmS: F-A, S-I		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 & sodium ion battery hazard label must be used for batteries which require a multi-modal form.

- The miscellaneous hazard label must not be used.
- The label must NOT display the word 'miscellaneous' on the label.
- CTU's containing packages displaying this label, must be placarded with the class 9 Miscellaneous goods placard. As per SP 384



Battery handling mark label must be used for batteries complying with Special Provision 188

- On the label, replace \* with UN number.
- Contact number is optional from 01 Jan 2023
- 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