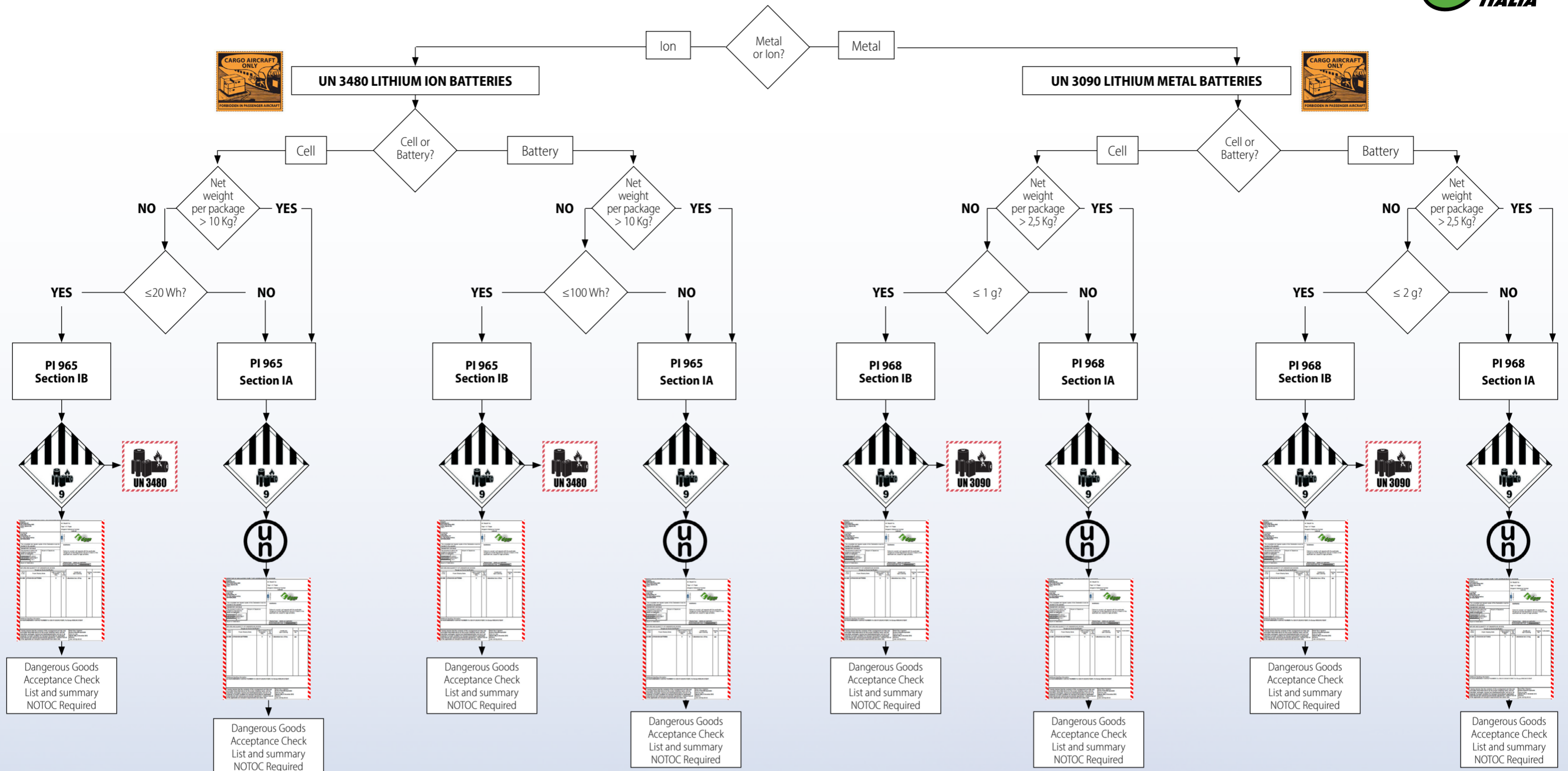


DEFINITIONS, CLASSIFICATION, PACKING, MARKING, LABELLING AND DOCUMENTATION OF LITHIUM ION/METAL BATTERIES (UN 3480/UN 3090)



DEFINITIONS

BATTERY means two or more cells or batteries which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking or protective devices. A single cell lithium battery is considered a "cell" and must be tested according to the testing requirements for "cells" for the purposes of these Regulations and the provisions of subsection 38.3 of the UN Manual of Tests and Criteria. Units which have two or more cells that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment are for the purposes of the Model Regulations and this Manual treated as batteries.

Note: The term "lithium battery" refers to a family of different chemistries, comprising many types of cathodes and electrolytes. For the purposes of the Regulations they are separated into:

- Lithium metal batteries are normally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. The most common type of lithium cell used in consumer applications uses metallic lithium as anode and manganese dioxide as cathode, with a salt of lithium dissolved in an organic solvent; and
- Lithium ion batteries (sometimes abbreviated Li-ion batteries) are a type of secondary (rechargeable) battery commonly used in consumer electronics. Also included within lithium-ion batteries are lithium polymer batteries.

CELL means a single enclosed electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals. Under these Regulations and the UN Manual of Tests and Criteria, to the extent the enclosed electrochemical unit meets the definition of "cell" herein, it is a "cell", not a "battery", regardless of whether the unit is termed a "battery" or a "single cell battery" outside of these Regulations and the UN Manual of Tests and Criteria.

COMPONENT CELL means a cell contained in a battery. A component cell is not to be considered a single cell battery.

SINGLE CELL BATTERY means a cell externally fitted with devices necessary for use in equipment or another battery which it is designed to power, for example protective devices.

Note: A single cell battery is considered a "cell" and must be tested and transported according to the requirements for "cells" for the purposes of this Regulations.

GENERAL REQUIREMENTS

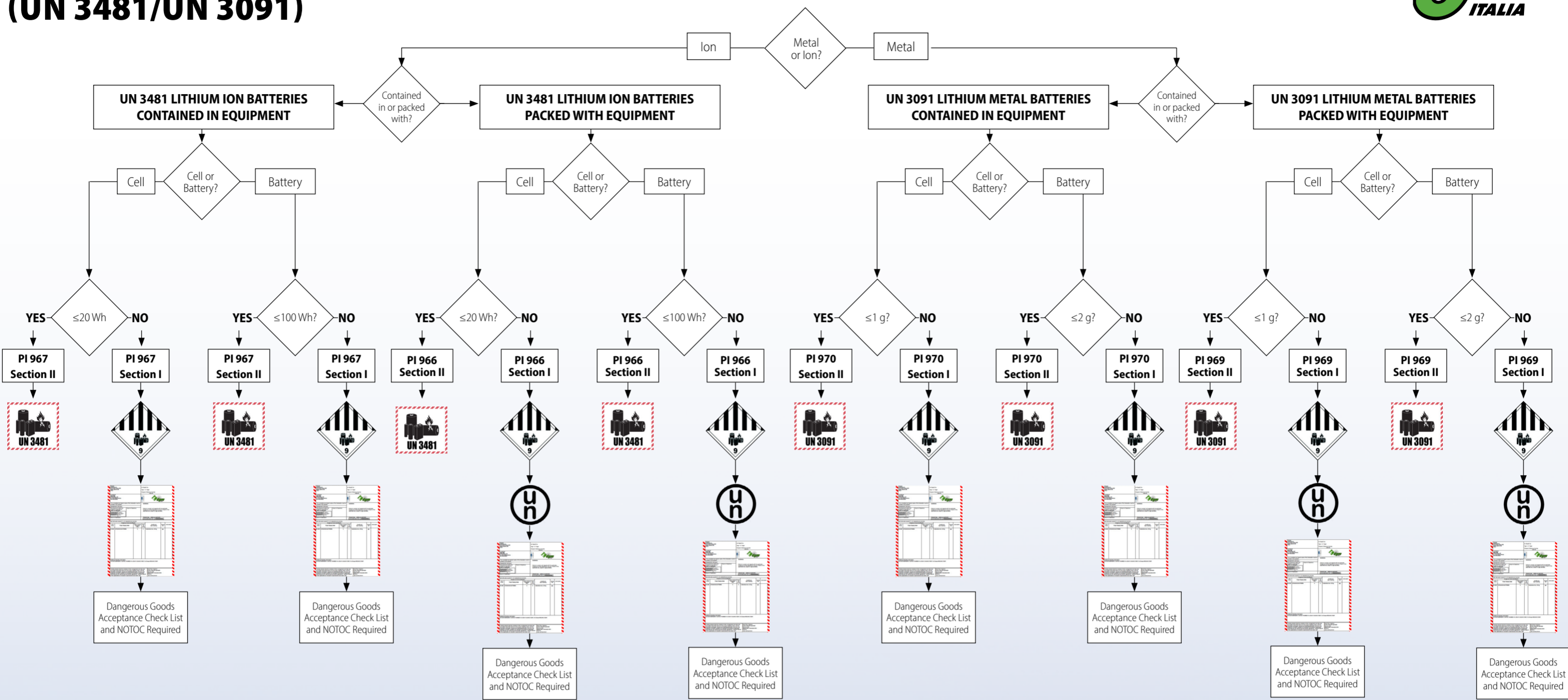
- Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;
- Waste batteries and batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the Operator;
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

- Lithium ion cells and batteries must be offered for transport at a state of charge (SoC) not to exceed 30% of their rated design capacity. **(for UN 3480 only)**
Cells and/or batteries at a SoC of greater than 30% of their rated capacity may only be shipped with the approval of the State of origin and the State of the Operator under the written conditions established by those authorities. **(for UN 3480 only – Sections IA/IB only).**

ADDITIONAL REQUIREMENTS

SECTION IA <p>The General Packing Requirements of 5.0.2 must be met. Each cell and battery must meet the provisions of 3.9.2.6.1.</p>	SECTION IB <p>Each cell and battery must meet the provisions of 3.9.2.6.1 (a), (e) and (g) (for UN 3480 only). Each cell and battery must meet the provisions of 3.9.2.6.1 (a), (e), (f), if applicable and (g) (for UN 3090 only). Quantities of cells or batteries prepared in accordance with this section are subject to all of the applicable provisions of these Regulations (including the General Requirements of this packing instruction), except for the provisions of Section 6.</p>
TRAINING Any person preparing or offering cells or batteries for transport must be trained commensurate with the functions for which they are responsible.	TRAINING Any person preparing or offering cells or batteries for transport must be trained commensurate with the functions for which they are responsible.
DOCUMENTATION A Shipper's declaration must contain: <ul style="list-style-type: none"> UN number and PSN; Class 9; Number and kind of packages; Net weight per package and PI. 	DOCUMENTATION Cells or batteries shipped under the provisions of Section IB must be described on a Shipper's Declaration as set out in Section 8, and the air waybill, when used, must contain the applicable information required by 8.2.1 and 8.2.2. A Shipper's declaration must contain: <ul style="list-style-type: none"> UN number and PSN; Class 9; Number and kind of packages; Net weight per package; PI and "IB"
PACKING Cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance standards; A cell or battery with a weight of 12 kg or greater and having a strong, impact-resistant outer casing may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Section 6 of these Regulations, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment. Cells and batteries must not be packed in the same outer packaging with dangerous goods classified in Class 1 (explosive) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers). Packages containing cells or batteries must not be placed in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1. Limit per each package: 35 kg net weight.	PACKING Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1. Cells and batteries must be packed in inner packagings that completely enclose the cell or battery. To provide protection from damage or compression to the batteries, the inner packagings must be placed in a strong rigid outer packaging of one of the following packaging types: drums, jerrycans or boxes. Each package must be capable of withstanding a 1.2 m drop test in any orientation without: <ul style="list-style-type: none"> damage to cells or batteries contained therein; shifting of the contents so as to allow battery to battery (or cell to cell) contact; release of contents. Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours. Limit per each package: 10 kg net weight (for UN 3480 only) . Limit per each package: 2.5 kg net weight (for UN 3090 only) . Cells and batteries must not be packed in the same outer packaging with dangerous goods classified in Class 1 (explosive) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers). Packages containing cells or batteries must not be placed in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.
MARKING AND LABELLING Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case (for UN 3480 only) ; Every package must be marked with UN number, PSN, Shipper, Consignee and net weight of cells/batteries contained in the package when required by 7.1.4.1 c). Class 9 and CAO labels required.	MARKING AND LABELLING The Watt-hour rating of lithium battery must be marked on the outside case except those manufactured before 1 January 2009 (for UN 3480 only) . Each package must be marked with UN number, PSN, Shipper, Consignee and net weight of package when required by 7.1.4.1 c). Class 9 and CAO labels and lithium batteries mark required.
HANDLING Acceptance Check List and summary NOTOC required containing only: UN number, PSN, class, total qty at each loading station and the aerodrome at which the package is to be unloaded. Packages and overpacks containing lithium batteries prepared in accordance with Section IA of PI 965 and PI 968 must not be stowed on an aircraft next to, or in a position that would allow interaction in the event of damage/fire with packages or overpacks containing dangerous goods which bear a Class 1, other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1 hazard label.	HANDLING Acceptance Check List and summary NOTOC required containing only: UN number, PSN, class, total qty at each loading station and the aerodrome at which the package is to be unloaded. Packages and overpacks containing lithium batteries prepared in accordance with Section IB of PI 965 and PI 968 must not be stowed on an aircraft next to, or in a position that would allow interaction in the event of damage/fire with packages or overpacks containing dangerous goods which bear a Class 1, other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1 hazard label.

DEFINITIONS, CLASSIFICATION, PACKING, MARKING, LABELLING AND DOCUMENTATION OF LITHIUM ION/METAL BATTERIES CONTAINED IN EQUIPMENT OR PACKED WITH EQUIPMENT (UN 3481/UN 3091)



DEFINITIONS

BATTERY means two or more cells or batteries which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking or protective devices. A single cell lithium battery is considered a "cell" and must be tested according to the testing requirements for "cells" for the purposes of these Regulations and the provisions of subsection 38.3 of the UN Manual of Tests and Criteria. Units which have two or more cells that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment are for the purposes of the Model Regulations and this Manual treated as batteries.

Note: The term "lithium battery" refers to a family of different chemistries, comprising many types of cathodes and electrolytes. For the purposes of the Regulations they are separated into:

- Lithium metal batteries are normally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. The most common type of lithium cell used in consumer applications uses metallic lithium as anode and manganese dioxide as cathode, with a salt of lithium dissolved in an organic solvent; and
- Lithium ion batteries (sometimes abbreviated Li-ion batteries) are a type of secondary (rechargeable) battery commonly used in consumer electronics. Also included within lithium-ion batteries are lithium polymer batteries.

CELL means a single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals. Under these Regulations and the UN Manual of Tests and Criteria, to the extent the encased electrochemical unit meets the definition of "cell" herein, it is a "cell", not a "battery", regardless of whether the unit is termed a "battery" or a "single cell battery" outside of these Regulations and the UN Manual of Tests and Criteria.

COMPONENT CELL means a cell contained in a battery. A component cell is not to be considered a single cell battery.

EQUIPMENT: means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

SINGLE CELL BATTERY means a cell externally fitted with devices necessary for use in equipment or another battery which it is designed to power, for example protective devices.

Note: A single cell battery is considered a "cell" and must be tested and transported according to the requirements for "cells" for the purposes of this Regulations.

VEHICLE: vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are electrically-powered cars, scooters, three- and four-wheeled vehicles or motorcycles, trucks, bicycles (pedal cycles with an electric motor - e-bikes), and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheel chairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft.

GENERAL REQUIREMENTS

- Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.
- Equipment containing batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1 (for "contained in" only).

ADDITIONAL REQUIREMENTS

SECTION I	SECTION II
<p>The General Packing Requirements of 5.0.2 must be met (for "packed with" only). Each cell and battery must meet the provisions of 3.9.2.6.1.</p>	<p>Each cell and battery must meet the provisions of 3.9.2.6.1 (a), (e) and (g) (for UN 3481 only). Each cell and battery must meet the provisions of 3.9.2.6.1 (a), (e), (f), if applicable and (g) (for UN 3091 only). Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport. (for "contained in" only)</p> <p>Lithium cells or batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:</p> <ul style="list-style-type: none"> provision of adequate instruction (1.6); dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium ion batteries as specifically permitted may be carried in carry-on and checked baggage; dangerous goods in air mail (Subsection 2.4); marking of packages (7.1.5.5); reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).
<p>TRAINING</p> <p>Any person preparing or offering cells or batteries for transport must be trained commensurate with the functions for which they are responsible.</p>	<p>TRAINING</p> <p>Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with the functions for which they are responsible. Information on adequate instruction can be found in subsection 1.6.</p>
<p>DOCUMENTATION</p> <p>A Shipper's declaration must contain:</p> <ul style="list-style-type: none"> UN number and PSN; Class 9; Number and kind of packages; Net quantity per package and PI. 	<p>DOCUMENTATION</p> <p>A Shipper's declaration for Dangerous Goods is not required.</p> <p>Where a consignment includes packages bearing the lithium battery handling label, the words "Lithium ion batteries in compliance with Section II of PI 966 or 967" or "Lithium metal batteries in compliance with Section II of PI 969 or 970" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the Air Way Bill.</p> <p>Where packages of Section II lithium batteries from multiple packing instructions are included on one air waybill, the compliance statement for the different lithium battery types and/or packing instructions may be combined into a single statement provided that the statement identifies the applicable lithium battery type(s), packing instructions numbers and "CAO".</p> <p>Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:</p> <ul style="list-style-type: none"> the shipper must ensure that all applicable parts of both packing instructions are met. The total weight of lithium batteries contained in any package must not exceed 5 kg; the words "lithium ion batteries, in compliance with Section II of PI 966" must be placed on the air waybill, when an air waybill is used (for UN 3481). the words "lithium metal batteries, in compliance with Section II of PI 969" must be placed on the air waybill, when an air waybill is used (for UN 3091).
<p>PACKING</p> <p>Cells and/or batteries must:</p> <ul style="list-style-type: none"> be completely enclosed in inner packagings then placed in a packaging of the type shown below that meets the Packing Group II performance standards, then placed with the equipment in a strong rigid outer packaging; or be completely enclosed in inner packagings then placed with equipment in a packaging of a type shown below that meets the Packing Group II performance standards. (for "packed with" only). <p>1A2, 1B2, 1D, 1G, 1H2, 1N2, 3A2, 3B2, 3H2, 4A, 4B, 4C1/4C2, 4D, 4F, 4G, 4H2, 4N.</p> <p>The equipment must be secured against movement within the outer packagings. (for "packed with" only).</p> <p>The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment. (for "packed with" only).</p> <p>The equipment must be packed in strong rigid outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1. Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained; (for "contained in" only).</p> <p>The equipment, containing the cells or batteries, must be secured against movement within the outer packaging and be packed so as to prevent accidental activation. (for "contained in" only)</p> <p>Where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment. (for "contained in" only).</p> <p>The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery (for UN 3091 "contained in" only).</p> <p>Lithium metal and lithium alloy cells and batteries prepared for transport on Passenger Aircraft as class 9 (for UN 3091 "packed with" only):</p> <ul style="list-style-type: none"> must be packed in either rigid metal intermediate or a metal outer packaging; cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and being placed in either the metal intermediate or metal outer packaging; when the package does not meet the above requirements, the package(s) must bear the "Cargo Aircraft Only" label and the Shipper's Declaration must indicate "Cargo Aircraft Only"; <p>Net weight of lithium ion/metal cells or batteries per package: 5 kg PAX, 35 kg CAO.</p>	<p>PACKING</p> <p>The equipment must be secured against the movement within the outer packaging. (for "packed with" only).</p> <p>Cells and batteries must:</p> <ul style="list-style-type: none"> be completely enclosed in inner packagings then placed in a strong rigid outer packaging that conforms to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1 or be completely enclosed in inner packagings then placed with equipment in a strong rigid outer packaging that conforms to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1 (for "packed with" only) <p>The equipment must be packed in strong rigid outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1. Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained. (for "contained in" only)</p> <p>The equipment containing the cells or batteries must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation. (for "contained in" only)</p> <p>The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment. (for "packed with" only).</p> <p>Each package of cells or batteries, or the completed package must be capable of withstanding a 1.2 m drop test in any direction without: (for "packed with" only):</p> <ul style="list-style-type: none"> damage to cells or batteries contained therein; shifting of the contents so as to allow battery to battery (or cell to cell) contact; release of contents. <p>The equipment must be packed in strong rigid outer packaging constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the cell or battery is afforded equivalent protection by the equipment in which it is contained (for "contained in" only).</p> <p>Where multiple pieces of equipment are packed in the same outer packaging, each piece of the equipment must be packed and protected against contact with other equipment so as to prevent damage. (for "contained in" only).</p> <p>Net weight of lithium ion/metal cells or batteries per package: 5 kg PAX, 5 kg CAO</p> <p>OVERPACKS: Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that the packages do not contain substances which might react dangerously with each other. When packages are placed in an overpack:</p> <ol style="list-style-type: none"> the packages must be secured within the overpack; the intended function of each package must not be impaired by the overpack; and the overpack must be marked with the word "OVERPACK" in lettering at least 12 mm high and durably and legibly marked with the mark shown in Figure 7.1.C, unless the marks representative of those on the package(s) inside the overpack are visible.
<p>MARKING AND LABELLING</p> <p>Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case (for UN 3481 only);</p> <p>Every package must be marked with UN number, PSN, Shipper, Consignee and net weight of cells/batteries contained in the package when required by 7.1.4.1 c). Class 9 label required.</p>	<p>MARKING AND LABELLING</p> <p>The Watt-hour rating must be marked on the outside case except those manufactured before 1 January 2009 (for UN 3481 only).</p> <p>Each package must be durably and legibly marked with the lithium battery mark, Figure 7.1.C, as required by 7.1.5.5. The package must be of such size that there is adequate space to affix the mark on one side of the package without the mark being folded.</p> <p>Each package must be marked with a lithium battery mark (Figure 7.4.H).</p> <p>This requirement does not apply to:</p> <ul style="list-style-type: none"> packages containing only button cells batteries installed in equipment (including circuit boards); or consignments of two packages or less where each package contains no more than four cells or two batteries installed in equipment. (for "contained in" only) <p>The package must be of such size that there is adequate space to affix the mark on one side of the package without the mark being folded.</p>
<p>HANDLING</p> <p>Acceptance check list and NOTOC required</p>	<p>HANDLING</p> <p>Acceptance check list and NOTOC not required</p>