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Transportation of Dangerous Goods



TDG Bulletin

Transporting Batteries

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TABLE OF CONTENTS

Classification	3
Shipping Document.....	5
Dangerous Goods Safety Marks	7
Means of Containment	13
Training	14
Special Cases and Special Provisions	14
Contact Information.....	20

This bulletin explains battery transport requirements. It does not change, create, amend or suggest deviations to the Transportation of Dangerous Goods (TDG) Regulations. For specific details, consult the TDG Regulations.

Transporting Batteries

Classification

What is a battery?

Since the term “battery” is not defined in the TDG Regulations, we must rely on the dictionary definition. The French dictionary Larousse defines a battery as a device that stores energy to be released as needed (for example, **cells** or **batteries**).

What is the difference between a cell and a battery?

A **cell** is a single encased electrochemical unit (one positive and one negative electrode) with a voltage differential across its two terminals (e.g., AA and AAA batteries).

A **battery** consists of two or more cells connected electrically and equipped with features such as casings, terminals, markings, and protective devices to ensure they work properly (e.g., cordless phone batteries, etc.).

Why is it important to classify batteries properly?

Some batteries are regulated as dangerous goods because they may pose hazards during transport. These hazards include:

- Short circuits, which can lead to fires; and/or
- Leaks of corrosive liquid or other material that can injure people or harm the environment.

Who is responsible for classifying batteries?

The consignor is responsible for classifying dangerous goods (batteries in this case) in accordance with [Part 2](#) of the TDG Regulations.

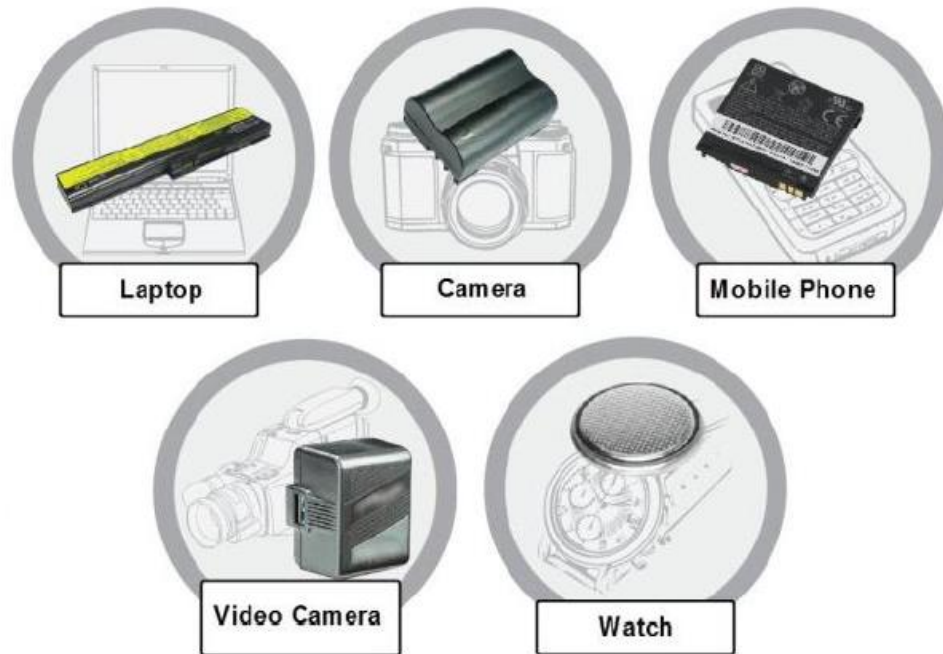
Batteries are typically classified as Class 8, Corrosives or Class 9, Miscellaneous Products, Substances or Organisms, though some may be considered Class 4.3, Water Reactive Substances.

Are lithium batteries considered dangerous goods?

Yes. In Canada, the shipping and importing of lithium batteries is subject to the *Transportation of Dangerous Goods Act, 1992* (TDG Act) and its regulations. They are considered dangerous goods much like gasoline, propane and sulfuric acid.

Where are lithium batteries found?

Lithium batteries are used in a wide range of electronic devices such as cameras, cell phones, laptop computers, medical equipment, power tools, etc.



What are the possible shipping names for batteries?

UN #	Shipping Name and Description	Class
UN2794	BATTERIES, WET, FILLED WITH ACID, electric storage	8
UN2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8
UN2800	BATTERIES, WET, NON-SPILLABLE, electric storage	8
UN3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8
UN3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9

UN3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	9
UN3292	BATTERIES, CONTAINING SODIUM or CELLS, CONTAINING SODIUM	4.3
UN3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9
UN3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	9

What is the difference between a “lithium metal battery” and a “lithium ion battery”?

Lithium metal batteries are usually non-rechargeable, contain metallic lithium, and have a higher energy density than other non-rechargeable batteries. Among other things, they are often used in calculators, pacemakers, remote car locks, and watches.

Lithium ion batteries are rechargeable, do not contain metallic lithium, and have a high energy density. Lithium polymer batteries are considered a type of lithium ion battery. Lithium ion batteries are used in consumer goods such as cell phones, electric vehicles, laptop computers, power tools, drones, etc.

What is the difference between “contained in equipment” and “packed with equipment”?

A lithium ion or lithium metal battery **contained in equipment** means a battery that is embedded in the device. Examples include calculators, laptop computers, or watches.

A lithium ion or lithium metal battery **packed with equipment** is not embedded in the device. An example would be a power tool packed alongside a spare battery.

Is a shipping document always required when transporting batteries?

Yes. Unless exempt from the TDG Regulations through a special case, special provision or equivalency certificate, battery shipments must fully comply with the TDG Regulations.

When shipping batteries by marine or air transport, consult [Parts 11](#) and [12](#) of the TDG Regulations as well as the following documents:

- The International Civil Aviation Organization's *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (ICAO Technical Instructions);
or
- The International Maritime Organization's *International Maritime Dangerous Goods Code* (IMDG Code).

Are electronic shipping documents allowed during transport?

No. A paper copy of the shipping document must always accompany the dangerous goods. Even if the consignor sends electronic copies to the carrier, the carrier must print the document before transporting the dangerous goods and keep a copy of it with the shipment.

Does the shipping document need to be in a certain format?

No. It can be in any format, provided it contains the information required under [Part 3](#) of the TDG Regulations.

However, when dangerous goods are shipped by air, the shipping document must have, in the left and right margins, red hatchings that slant to the left or right as shown below. In addition, [Section 12.2](#) of the TDG Regulations states that the shipping document must be completed in accordance with Chapter 4, Documentation, of Part 5, Shipper's Responsibilities, of the ICAO Technical Instructions.

The image shows a sample of a 'SHIPPER'S DECLARATION FOR DANGEROUS GOODS' form. The form is enclosed in a red and white striped border. It contains several sections: 'SHIPPER' (Name, Address, Phone, Fax, Email, Website, ICAO Reference Number), 'CONSIGNEE' (Name, Address, Phone, Fax, Email, Website, ICAO Reference Number), 'SHIPPER'S DECLARATION' (I hereby declare that the goods described in this declaration are dangerous goods as defined in the TDG Regulations, and that I have provided the necessary information to the carrier in accordance with the TDG Regulations), 'DANGEROUS GOODS CLASSIFICATION' (A table with columns for UN Number, Name, Class, Division, and Packing Group), and 'SHIPPER'S SIGNATURE' (Name, Title, Date, Signature). The table for dangerous goods classification is currently empty.

What information is required on the shipping document?

At **minimum**, the shipping document must include:

- The name and address of the consignor in Canada
- The shipping date
- A description of the dangerous goods, in the following order:
 - The UN number
 - The shipping name of the dangerous goods
 - The primary and subsidiary class
 - Where applicable, the packing group in roman numerals
- The quantity in metric (e.g., kg or L) for transports originating in Canada
- The "24-Hour Number" of a person who can provide technical information on the dangerous goods
- The consignor's certification

Note: Other information may be required depending on the mode of transport. For more information on shipping documents, consult [Part 3](#) of the TDG Regulations and the following TDG Bulletin: [TDG Bulletin - Shipping Documents](#).

Dangerous Goods Safety Marks

What dangerous goods safety marks must be displayed on batteries?

[Part 4](#) of the TDG Regulations requires that dangerous goods safety marks be displayed on the **means of containment** containing dangerous goods in transport. **Note that, under the TDG Regulations, safety marks do not have to be displayed directly on batteries because they are considered dangerous goods and not means of containment.**

Safety marks are placed on a container to identify dangerous goods and the type of hazard they present.

A truck transports batteries that are not in a means of containment. What labels and/or placards are required?

On the batteries

The batteries do not need labels, since the TDG Regulations require them only on small means of containment and batteries are not considered means of containment.

On the truck

Under [Section 4.15](#) of the TDG Regulations, the **primary class placard** for every dangerous good transported in a large means of containment (Class 9, for example) must be displayed on each side and at each end of the large means of containment (the truck, for example).

Note: The TDG Regulations allow an exemption to placard requirements if the gross mass of dangerous goods in a road or railway vehicle is 500 kg or less. However, placards may still be voluntarily displayed. For more details, consult [Sections 4.16.1](#) and [4.1.1](#) of the TDG Regulations.

A truck transports batteries in a small means of containment. What labels and/or placards are required?

On the small means of containment

Since the batteries are in small means of containment, the labelling requirements of Part 4 of the TDG Regulations apply.

Therefore, each small means of containment must display:

- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

On the truck

As per [Section 4.15](#) of the TDG Regulations, the **primary class placard** for every dangerous good transported in a large means of containment (Class 9, for example) must be displayed on each side and at each end of the large means of containment (the truck, for example).

Note: The TDG Regulations allow an exemption to placard requirements if the gross mass of dangerous goods in a road or railway vehicle is 500 kg or less. However, placards may still be voluntarily displayed. For more details, consult [Sections 4.16.1](#) and [4.1.1](#) of the TDG Regulations.

A truck transports batteries that are placed directly on a pallet and secured by shrink wrap. The pallet's total capacity (volume) is 450 litres or less. What labels and/or placards are required?

On the batteries

The batteries do not need labels since the TDG Regulations require them only on small means of containment and batteries are not considered means of containment.

On the pallet

In this situation, the pallet is considered a small means of containment.

Therefore, the small means of containment (i.e., the pallet and the shrink wrap securing the batteries) must display:

- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

Note: This shipment does not qualify as an overpack as defined in [Section 1.4](#) of the TDG Regulations, since the batteries are placed directly on the pallet rather than in separate small means of containment.

If this pallet is the only small means of containment transported, the shipping document will display “1” in the column indicating the number of small means of containment on which labels are displayed.

On the truck

Under [Section 4.15](#) of the TDG Regulations, the **primary class placard** for every dangerous good transported in a large means of containment (Class 9, for example) must be displayed on each side and at each end of the large means of containment (the truck, for example).

Note: The TDG Regulations allow an exemption to placard requirements if the gross mass of dangerous goods in a road or railway vehicle is 500 kg or less. However, placards may still be voluntarily displayed. For more details, consult [Sections 4.16.1](#) and [4.1.1](#) of the TDG Regulations.

A truck transports batteries that are placed in small means of containment and then put on a pallet and secured by shrink wrap. The pallet’s total capacity (volume) is 450 litres or less. What labels and/or placards are required?

On the small means of containment

Since the batteries are in small means of containment, the labelling requirements of [Part 4](#) of the TDG Regulations apply.

Therefore, each small means of containment must display:

- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

On the pallet

In this case, the pallet containing the batteries may be considered an overpack if it meets the definition found in [Section 1.4](#) of the TDG Regulations (for example, it must contain dangerous goods originating from the same consignor).

If it is considered an overpack, [Section 4.10.1](#) of the TDG Regulations will apply.

Therefore, the pallet and the shrink wrap securing the batteries must display:

- The word OVERPACK (not required if the safety marks for each class of dangerous goods inside the overpack are visible through the overpack)
- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

Note: If the pallet is not considered an overpack, [Section 4.10.1](#) of the TDG Regulations does not apply and the word OVERPACK will not be required. However, the pallet will still need to meet dangerous goods safety marks requirements for small means of containment.

On the truck

As per [Section 4.15](#) of the TDG Regulations, the **primary class placard** for every dangerous good transported in a large means of containment (Class 9, for example) must be displayed on each side and at each end of the large means of containment (the truck, for example).

Note: The TDG Regulations allow an exemption to placard requirements if the gross mass of dangerous goods in a road or railway vehicle is 500 kg or less. However, placards may still be voluntarily displayed. For more details, consult [Sections 4.16.1](#) and [4.1.1](#) of the TDG Regulations.

A truck transports batteries that are placed directly on a pallet and secured by shrink wrap. The pallet's total capacity (volume) is greater than 450 litres. What labels and/or placards are required?

On the batteries

The batteries do not need labels since the TDG Regulations require them only on means of containment and batteries are not considered means of containment.

On the pallet and the truck

Unless otherwise indicated, any large means of containment that transports dangerous goods must be standardized. Since no standard adopted by reference in the TDG Regulations may be used to transport batteries in a large means of containment, an equivalency certificate must be obtained from Transport Canada. This certificate will indicate which safety marks to display on the pallet and/or the truck.

To learn how to apply for an equivalency certificate, please visit the [Equivalency Certificate](#) or consult [Part 14](#) of the TDG Regulations.

A truck transports batteries that are placed in small means of containment and then put on a pallet and secured by shrink wrap. The pallet's total capacity (volume) is greater than 450 litres. What labels and/or placards are required?

On the small means of containment

Since the batteries are in small means of containment, the labelling requirements of Part 4 of the TDG Regulations apply.

Therefore, each small means of containment must display:

- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

On the pallet

In this case, the pallet containing the batteries may be considered an overpack if it meets the definition found in [Section 1.4](#) of the TDG Regulations (for example, it must contain dangerous goods originating from the same consignor). If it is considered an overpack, [Section 4.10.1](#) of the TDG Regulations will apply.

Therefore, the pallet and the shrink wrap securing the batteries must display:

- The word OVERPACK (not required if the safety marks for each class of dangerous goods inside the overpack are visible through the overpack)
- The primary and subsidiary class labels (if applicable)
- The shipping name
- The UN number

Note: If the pallet is **not** considered an overpack, [Section 4.10.1](#) of the TDG Regulations does not apply.

However, the pallet must meet dangerous goods safety mark requirements for large means of containment under [Section 4.15](#) of the TDG Regulations. Therefore, unless otherwise indicated, any large means of containment that transports dangerous goods must be standardized. Since no standard adopted by reference in the TDG Regulations may be used to transport batteries in a large means of containment, an equivalency certificate must be obtained from Transport Canada. This certificate will indicate which safety marks to display on the pallet and/or the truck.

To learn how to apply for an equivalency certificate, please visit the [Equivalency Certificate](#) or consult [Part 14](#) of the TDG Regulations.

On the truck

As per [Section 4.15](#) of the TDG Regulations, the **primary class placard** for every dangerous good transported in a large means of containment (Class 9, for example) must be displayed on each side and at each end of the large means of containment (the truck, for example).

Note: The TDG Regulations allow an exemption to placard requirements if the gross mass of dangerous goods in a road or railway vehicle is 500 kg or less. However, placards may still be voluntarily displayed. For more details, consult [Sections 4.16.1](#) and [4.1.1](#) of the TDG Regulations.

What dangerous goods safety marks are required for batteries transported by air?

Domestic transport

To ship batteries within Canada by air, [Part 12](#) of the TDG Regulations offers these two options:

1. Comply with the most recent version of the ICAO Technical Instructions and meet additional requirements under the TDG Regulations

OR

2. Meet requirements under [Sections 12.4](#) to [12.17](#) for certain types and quantities of dangerous goods

International transport

To ship or import batteries internationally by air, [Part 12](#) of the TDG Regulations requires that you comply with the ICAO Technical Instructions and additional requirements under the TDG Regulations.

To learn about dangerous goods safety marks requirements for batteries transported by air, please consult [Part 12](#) of the TDG Regulations.

What dangerous goods safety marks are required for batteries shipped by marine transport?

To learn about dangerous goods safety marks requirements for batteries transported by vessel please consult [Part 11](#) of the TDG Regulations.

Means of Containment

What standard must be used to transport batteries in small means of containment by road or rail?

As per [Section 5.12](#) of the TDG Regulations, when batteries (Classes 4, 8 or 9) are transported in small means of containment, it must be done in compliance with Packing Instruction 801 of Transport Canada Standard TP14850E. This packing instruction states that:

- Batteries may be handled, offered for transport or transported in a non-UN standardized container if they are placed in a rigid container, in a wooden slatted crate or on a pallet
- Batteries must be protected against short circuits
- Stacked batteries must be adequately secured in tiers separated by a layer of non-conductive material
- Battery terminals must not support the weight of other superimposed elements
- Batteries must be packaged or secured to prevent inadvertent movement

What standard must be used to transport batteries in large means of containment by road or rail?

When batteries are not individually packaged but instead stacked on a pallet, or when a large battery is placed on a pallet, [Section 5.14](#) of the TDG Regulations refers to standards CGSB-43.146 and CSA B621 (Canadian Standards Association).

However, means of containment built to these two standards are not designed for batteries. Therefore, to transport batteries in a non-standardized means of containment, you must apply for an equivalency certificate delivered by Transport Canada.

To learn how to apply for an equivalency certificate, please visit the [Equivalency Certificates](#) or consult [Part 14](#) of the TDG Regulations.

Training

Does an individual need training to transport batteries?

[Part 6](#) of the TDG Regulations requires that a person who handles, offers for transport or transports dangerous goods, be adequately trained and hold a valid training certificate. However, a person who does not have proper training or a valid training certificate may perform these activities in the presence and under direct supervision of a person who is properly trained and holds a valid training certificate.

Note: A special case ([Part 1](#) of the TDG Regulations) or a special provision ([Schedule 2](#) of the TDG Regulations) may exempt you from these training requirements.

To learn about training requirements, please consult [TDG Bulletin - TDG Training](#).

Special Cases and Special Provisions

What is a special case and how does it apply to the transport of batteries?

Special cases are situations partly or fully exempt from the TDG Regulations. These special cases are found in [Sections 1.15](#) to [1.50](#) of the Regulations.

[Section 1.15](#) (150 kg Gross Mass Exemption) and [Section 1.16](#) (500 kg Gross Mass Exemption) could apply to the transport of batteries. The two sections limit the gross mass of batteries to 150 or 500 kg respectively and require them to be transported in one or more means of containment, each with a gross mass of 30 kg or less.

As such, these exemptions apply only to the transport of batteries in means of containment with a gross mass of less than 30 kg. If batteries are transported on pallets, the pallets are considered the means of containment. Therefore, the calculation of the gross mass takes the pallet's mass into account.

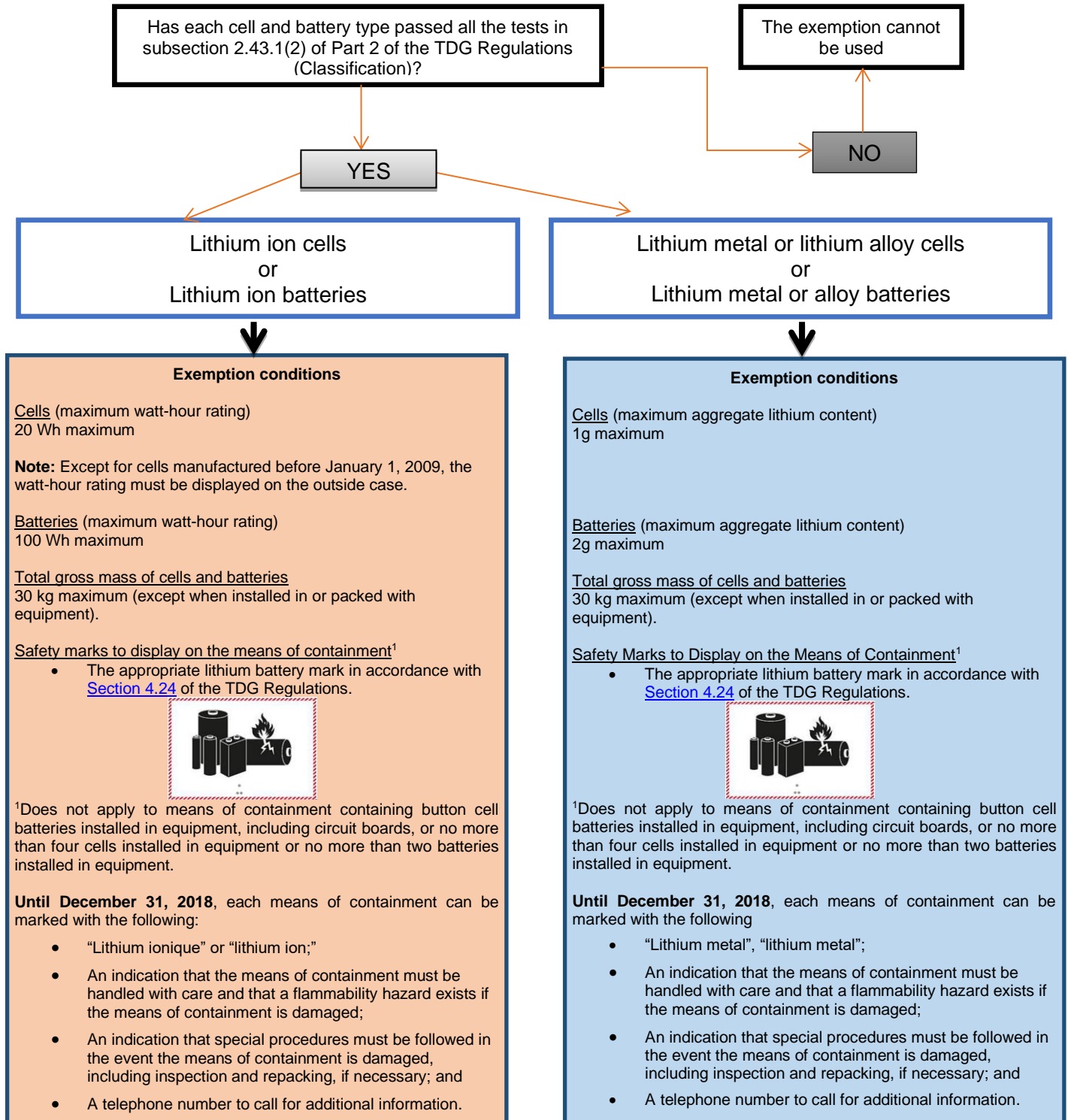
To learn more, please consult [Sections 1.15](#) to [1.50](#) of the TDG Regulations.

What special provisions apply to batteries?

UN #	Shipping Name and Description	Special Provisions (Schedule 2)
UN2794	BATTERIES, WET, FILLED WITH ACID, electric storage	None
UN2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	None
UN2800	BATTERIES, WET, NON-SPILLABLE, electric storage	39
UN3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	111
UN3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	34 , 123 , 137 , 138 , 149 , 159
UN3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including lithium alloy batteries) or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including lithium alloy batteries)	34 , 123 , 137 , 138 , 159
UN3292	BATTERIES, CONTAINING SODIUM or CELLS, CONTAINING SODIUM	None
UN3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	34 , 123 , 137 , 138 , 149 , 159
UN3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries) or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)	34 , 123 , 137 , 138 , 159

What are the requirements of Special Provision 34?

[Special Provision 34](#) exempts a person from the TDG Regulations (except for [Parts 1](#) and [2](#)) if lithium cells or batteries are handled, offered for transport or transported on a road vehicle, railway vehicle or vessel on a domestic voyage and if certain conditions are met.



In addition to the requirements in the above table, the special provision requires that cells and batteries be:

- Protected against short circuit, including protection against contact with conductive materials within the same packaging that could lead to a short circuit;
- Packed in a means of containment that completely encloses them; and
- Packed in a means of containment capable of withstanding a 1.2 m drop test in any orientation without damage to the cells or batteries contained inside the means of containment, without the contents shifting so as to allow battery-to-battery or cell-to-cell, contact, and without release of contents.

In addition to the requirements in the above table, **cells and batteries installed in equipment** must be (unless the equipment containing them offers equal protection):

- Protected against damage and short circuit, including protection against contact with conductive materials within the same packaging that could lead to a short circuit;
- Placed in a way that prevents accidental activation; and
- Packed in a means of containment designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no release of the dangerous goods that could endanger public safety.

Note: This requirement does not apply to cells and batteries installed in devices that are intentionally active during transport such as radio frequency identification transmitters, watches and sensors, and that are not capable of generating a dangerous evolution of heat.

Is there an exemption that applies for UN2800, BATTERIES, WET, NON-SPILLABLE, electric storage that are not intended for disposal?

Yes. [Special Provision 39](#) states that the TDG Regulations (except for Parts 1 and 2) do not apply to these dangerous goods if:

- At a temperature of 55°C, electrolyte will not flow from a ruptured or cracked battery case and there is no free liquid to flow; and
- When the battery is prepared for transport, its terminals are protected from short circuits.

What are the transport requirements for damaged or defective lithium metal/ion cells and batteries?

[Special Provision 137](#) of the TDG Regulations states that damaged or defective lithium metal/ion cells and batteries must be packed in accordance with Packing Instructions P908 or LP904 of the UN Recommendations, as applicable.

The outer means of containment or the overpack must be marked legibly and visibly on a contrasting background with the words “Damaged/Defective Lithium Ion Batteries” or “piles au lithium ionique endommagées/défectueuses” **or** “Damaged/Defective Lithium Metal Batteries” or “piles au lithium métal endommagées/défectueuses”, as applicable.

Please note:

- It is **forbidden** to transport lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective and that, under normal conditions of transport, are liable to disassemble rapidly, react dangerously, produce a flame or a dangerous evolution of heat, or produce a dangerous emission of toxic, corrosive or flammable gases or vapours.
- It is **forbidden** to transport by aircraft lithium ion cells or batteries and lithium metal cells or batteries that are damaged or defective.

What are the requirements for lithium metal and lithium ion cells/batteries transported for disposal or recycling?

Special [Provision 138](#) of the TDG Regulations states that lithium metal and lithium ion cells or batteries and equipment containing them, transported for disposal or recycling:

- Are not subject to [Subsection 2.43.1\(2\)](#) of [Part 2](#) (Classification);
- Must be packed in accordance with Packing Instructions P909 or LP904 of the UN Recommendations, as applicable, whether packed with or without non-lithium cells or batteries or the equipment containing them;
- Must be in a means of containment or an overpack marked legibly and visibly on a contrasting background with the words, as applicable, “Lithium Batteries for Disposal”, “Piles au lithium destinées à l’élimination”, “Lithium Batteries for Recycling” **or** “Piles au lithium destinées au recyclage”; and
- **Must not** be transported by air.

Note: Damaged or defective cells/batteries must be offered for transport or transported under [Special Provision 137](#) of the TDG Regulations.

Are there restrictions on the domestic or international transport of lithium metal and lithium ion cells/batteries as cargo on passenger aircraft?

Yes. [Special Provision 149](#) of the TDG Regulations states that UN3090, LITHIUM METAL BATTERIES and UN3480, LITHIUM ION BATTERIES are **forbidden** for transport as cargo on a passenger aircraft.

Which label must be displayed when transporting UN3090, UN3091, UN3480 or UN3481?

[Special Provision 159](#) of the TDG Regulations states that the label to be used for these dangerous goods is the one illustrated under the heading "Class 9, Lithium Batteries" in the appendix of [Part 4](#) (below).



Note: The generic Class 9 label may be used until December 31, 2018.

Contact Information

Compliance with the TDG Act and Regulations

Failure to comply with the TDG Act and Regulations may lead to fines and/or imprisonment. For more information, visit the TDG website at www.tc.gc.ca/tdg. If you have questions about the TDG Regulations, contact a Transport Canada dangerous goods inspector in your region.

Atlantic Region	1-866-814-1477	TDG-TMDAtlantic@tc.gc.ca
Quebec Region	514-633-3400	TMD-TDG.Quebec@tc.gc.ca
Ontario Region	416-973-1868	TDG-TMDOntario@tc.gc.ca
Prairie and Northern Region	1-888-463-0521	TDG-TMDPNR@tc.gc.ca
Pacific Region	604-666-2955	TDGPacific-TMDPacifique@tc.gc.ca