

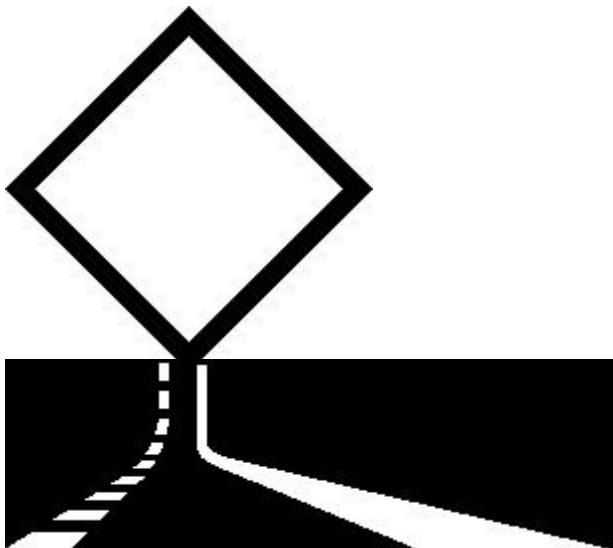
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**A Technical Publication
from the Co-ordination
and Information Centre**

Transportation of Batteries and Battery Fluids by Road

September 2010

**Dangerous Goods
And Rail Safety**



**Government
of Alberta** ■
Transportation

This material is meant as a guide to certain parts of the Transportation of Dangerous Goods Regulations and is not meant to be a substitute for them. It is the responsibility of handlers, offerers and transporters of dangerous goods to consult the Regulations for the exact requirements. The Co-ordination and Information Centre of Alberta Transportation can provide accurate information regarding the Regulations 24 hours a day.

Co-ordination and Information Centre

**Alberta Transportation
Dangerous Goods and Rail Safety Branch
Main Floor, Twin Atria Building
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Edmonton, Alberta, T6B 2X3**

**Tel. Edmonton: (780) 422 – 9600
Tel. Province-wide: 1 (800) 272 – 9600
Fax: (780) 427 – 1044**

These telephone lines are recorded to assist in responding to the emergency (natural/manmade) and/or inquiry regarding dangerous goods and to ensure that the information is accurate. Direct any questions regarding the recording to the Compliance Officer responding to your call or contact the Manager of the CIC at 780-427-8660. *Legal Authority: Dangerous Goods Transportation and Handling Act, Section 13(1).*

Introduction

This is one of a series of information bulletins that have been prepared by the Dangerous Goods and Rail Safety Branch of Alberta Transportation to assist shippers, handlers, offerers and transporters of dangerous goods. If you have any comments or suggestions about this document please contact the Co-ordination and Information Centre (CIC) at 1-800-272-9600 province wide.

Purpose of the TDG Act

The purpose of the Transportation of Dangerous Goods (TDG) Act and Regulations is to promote public safety when goods are being transported by road, rail, sea or air. When a transport vehicle carrying dangerous goods is in an accident, emergency response personnel (e.g. fire, police) must identify what those dangerous goods are before they can safely proceed. They identify the dangerous goods by looking at the placards on the vehicle and reading the dangerous goods documentation (which must be kept in the cab of the vehicle). Without this information the response to a spill or accident could be delayed or become dangerous to the responders.

The Steps to Full Compliance

Wet acid-filled or alkali-filled electric storage batteries and acid or alkali battery fluids cannot be sent as limited quantities or consumer commodities. Therefore this type of product must be shipped in full compliance with the Regulations. Full compliance requires:

1. proper documentation (includes shipping name, class and UN number);
2. safety marks on packages and vehicle (if necessary);
3. training; the person who has management, charge or control of the dangerous goods must be a trained person and hold a valid certificate of training; and
4. goods must be packaged so that a spill cannot take place during the normal conditions of transport.

Classification of Batteries and Battery Fluids

Batteries and battery fluids are classified as Class 8, Corrosives, in the TDG Regulations.

The table below describes the shipping names and UN numbers of some types of batteries and battery fluids listed in Schedule I of the Regulations.

Table 1: Classification of Batteries

Shipping Name	Class	UN Number	Packing Group
BATTERIES, WET, FILLED WITH ACID, electric storage *	8	UN2794	III
BATTERIES, WET, FILLED WITH ALKALI, electric storage *	8	UN2795	III
BATTERIES, WET, NON-SPILLABLE (these are the sealed or “maintenance free” type)*	8	UN2800	III
BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8	UN3028	III
Batteries, Gel Cell Type (No free liquid and unable to leak even if battery is damaged)	Not Regulated	n/a	n/a
LITHIUM BATTERIES**	9	UN3090	II
LITHIUM BATTERIES CONTAINED IN EQUIPMENT or LITHIUM BATTERIES PACKED WITH EQUIPMENT**	9	UN3091	II
BATTERIES CONTIANING SODIUM; or CELLS CONTAINING SODIUM	4.3	UN3292	II

Table 2: Classification of Battery Fluids

Shipping Name	Class	UN number	Packing Group
BATTERY FLUID, ACID; Or SULFURIC ACID with not more than 51% acid; Or SULPHURIC ACID with not more than 51% acid	8	UN2796	II
BATTERY FLUID, ALKALI	8	UN2797	II

NOTE: UN3480 and UN3481 (Lithium Ion Batteries) are not listed in the TDG Regulations but are listed in 49 CFR, UN Recommendations, ICAO Technical Instructions and the IMDG Code.

* Special Provision 39 of the TDG Regulations applies to UN2794, UN2795 and UN 2800:

- (1) These dangerous goods may be handled, offered for transport or transported under this shipping name if the dangerous goods are:
 - a. protected from short circuits and
 - b. capable of withstanding, without leakage of battery fluid, the following tests:
 - i. a vibration test and
 - ii. a pressure differential test;(designed to test fill openings and vents for potential leaks)

- (2) The TDG Regulations do not apply to UN2800, BATTERIES, WET, NON-SPILLABLE, electric storage, that are not intended for disposal if,
 - a. 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
 - b. when the battery is prepared for transport, the battery's terminals are protected from short circuits

** Special Provision 34 of the TDG Regulations applies to UN 3090 and UN3091:

- (1) Lithium cells and batteries may be transported under this shipping name, if
 - a. each cell or battery is included in Class 9 in accordance with section 38.3 of Part III of the Manual of Tests and Criteria;
 - b. each cell contains not more than 12 g of lithium or lithium alloy;
 - c. each battery contains not more than 500 g of lithium or lithium alloy;
 - d. each cell or battery has a safety venting device or is designed to prevent a violent rupture under normal conditions of transport;
 - e. each cell or battery is equipped with an effective means of preventing external short circuits;
 - f. each battery containing cells or a series of cells connected in parallel is equipped with diodes to prevent reverse current flow; and
 - g. the cells and batteries are packed in a means of containment to prevent short circuits and movement that could lead to short circuits.
- (2) These Regulations do not apply to lithium cells and batteries if
 - a. each cell with a liquid cathode contains not more than 0.5 g of lithium or lithium alloy;
 - b. each battery with a liquid cathode contains a total quantity of not more than 1 g of lithium or lithium alloy;
 - c. each cell or battery with a liquid cathode is hermetically sealed;
 - d. each cell with a solid cathode contains not more than 1 g of lithium or lithium alloy;
 - e. each battery with a solid cathode contains a total quantity of not more than 2 g of lithium or lithium alloy;
 - f. each lithium-ion cell contains a total quantity of not more than 1.5 g of equivalent lithium content, where the equivalent lithium content in grams is 0.3 times the rated capacity of the cell in ampere-hours;
 - g. each lithium-ion battery contains a total quantity of not more than 8 g of

equivalent lithium content, where the equivalent lithium content in grams is 0.3 times the rated capacity of the battery in ampere-hours.

- h. for a liquid cathode battery that contains more than 0.5 g of lithium or lithium alloy or a solid cathode battery that contains more than 1 g of lithium or lithium alloy, the battery does not contain a liquid or gas that is dangerous goods unless the liquid or gas, if free, would be completely absorbed or neutralized by other materials in the battery; and
 - i. the cells are separated to prevent short circuits; and
 - j. the batteries are separated to prevent short circuits and, except when they are installed in electronic devices, are packed in strong means of containment.
- (3) These Regulations do not apply to lithium cells or batteries if
- a. the cells or batteries are not included in Class 9 in accordance with section 38.3 of Part III of the Manual of Tests and Criteria;
 - b. each cell contains not more than 5 g of lithium or lithium alloy;
 - c. each battery contains not more than 25 g of lithium or lithium alloy;
 - d. the cells and batteries are packed or are designed to prevent short circuits under normal conditions of transport.

Waste Batteries (Used Batteries)

Used batteries are considered a waste and must either go to a recycler or a disposal company. When collecting used batteries for recycling it is recommended that you use the "Recycle Docket" from Alberta Environment. This document is an equivalent to the dangerous goods shipping document.

Used batteries are often in poor condition and pose a significant spill hazard. For this reason you are required to take steps to "leak-proof" any vehicle transporting them. The means of leak-proofing is up to the carrier but should involve secondary containment such as: plastic bins or drums or a plastic liner for the cargo compartment.

Other Non-Hazardous Batteries

The following batteries are not regulated by the TDG Act and Regulations. If disposing of large numbers of these batteries please contact the Hazardous Waste Policy Specialist with Alberta Environment, Reclamation Policy Branch at (780)427-0637 (or for a toll-free call in Alberta dial 310-0000), for disposal advice.

1. Nickel-Cadmium (NiCad's) rechargeable consumer batteries.
2. Household type Dry Cell Batteries (includes ordinary carbon or alkaline batteries).

Dangerous Goods Shipping Document

The information required on a shipping document and on a railway consist must be easy to identify, legible, in indelible print and in English or French [Section 3.4]. The following table shows the minimum required information which must appear on a shipping document for the transportation of batteries and battery fluids.

Shipping Document Information	When Required	Where in the Regulations
Date	Always	3.5(1)(b)
Name and address of consignor	Always	3.5(1)(a)
Description of goods in the following order		3.5(1)(c)
a. Shipping name	Always	3.5(1)(c)(i)
b. Primary classification	Always	3.5(1)(c)(ii)
c. UN number	Always	3.5(1)(c)(v)
d. Packing group (none for compressed gases)	If Any	3.5(1)(c)(vi)
The quantity in the International System of Units (SI) ^{1,2}	Always	3.5(1)(d)
The number of containers ²	For dangerous goods in small containers requiring safety labels	3.5(1)(e)
The words “24-Hour Number” followed by a telephone number where the consignor can be easily reached ³	Always	3.5(1)(f)
Emergency Response Assistance Plan (ERAP) number and telephone number to activate it	If Required	3.6(1)

1. If the quantity of dangerous goods is less than 10% of the container’s maximum fill limit then the words “Residue – Last Contained” followed by the shipping name of the dangerous goods last contained in the means of containment may be used to describe the quantity. This does not apply to Class 2 gases in small containers and Class 7 radioactive substances [Section 3.5(4)].
2. If the quantity of dangerous goods or the number of small means of containment changes during transport, the carrier must show on the shipping document or on a document attached to the shipping document the change in the quantity of dangerous goods or the number of small containers. How the carrier shows the change in the quantity is the carrier’s choice. The carrier can change the number used to describe the quantity, or show additions or subtractions from the number used to express the quantity [Section 3.5(5)].

3. A consignor can also use the telephone number of an agency that is competent to give the technical information on the shipment. For example, it is possible to use CANUTEC as a source of technical information provided that the consignor has received permission in writing from CANUTEC [Section 3.5(2)].

The consignor and carrier must be able to produce a printed or electronic copy of the shipping document for two years after the shipping document was prepared. The consignor or carrier has 15 days to produce a shipping document if an inspector requests a copy in writing [Section 3.11].

For air shipments a prescribed form, the "Shippers Declaration for Dangerous Goods", must be used. For full details consult the International Air Transport Association (IATA) Regulations. Information can also be obtained by calling the air cargo handler in your area or Transport Canada's Dangerous Goods Inspectors (Air Mode) in Edmonton at 780-495-3810.

Location of Document During Transport

When the driver is in the power unit, a copy of the shipping document must be in a pocket mounted on the driver's door, or within the driver's reach. When the driver is out of the power unit, the document must be in the door pocket, on the driver's seat or in a location that is clearly visible to anyone entering through the driver's door [Section 3.7].

Waste Manifest

A waste manifest produced by Environment Canada is an accepted dangerous goods shipping document despite the requirements of Section 3.5 of the TDG Regulations. The waste manifest may be used as a dangerous document because Section 3.5(7) allows that the UN number required in the description of each of the dangerous goods may be included in the shipping document before the shipping name.

The waste manifest is used when shipping a dangerous good that is no longer usable in its original form and is intended for treatment, disposal or recycling. A waste manifest is a serialized pre-printed form which is only available through government offices. In order to obtain one please call Alberta Environment, Reclamation Policy Branch at (780) 427-0666 (for a toll free call in Alberta dial 310-0000).

SPECIAL CASES and PERMITS

The relaxation of certain requirements of the TDG Regulations is acceptable for properly packaged dangerous goods in small quantities that do not pose as severe a hazard. The following two exemptions may be used for batteries. The 150 kg gross mass exemption and the 500 kg gross mass exemption. These exemptions would generally **not apply** when shipping batteries on a pallet, as the pallet is considered a means of containment and the total mass would likely exceed 30 kg.

150 kg gross mass exemption

This exemption allows for the transportation of a small means of containment that has a gross mass of less than 30 kg per package to a total of 150 kg gross mass. When using this exemption documentation, safety marks, the means of containment, training and accidental release reporting requirement do not apply. This is only good for road or rail transport. For more specific requirements see Section 1.15 of the TDG Regulations.

500 kg gross mass exemption

This exemption allows for the transportation of a small means of containment that has a gross mass of less than 30 kg per package to a total of 500 kg gross mass. When using this exemption a short form of documentation is required detailing the Class and number of packages being transported. Safety marks are required on the containers and a training certificate must be present. This is only good for road or rail transport. For more specific requirements see Section 1.16 of the TDG Regulations.

Equivalency Certificate (Permit)

To transport batteries in non-standardized means of containment, you must apply to Transport Canada for an equivalency certificate. Although a pallet is not a standardized means of containment, Transport Canada has issued equivalency certificates to transport batteries on a pallet using shrink-wrap. You can view a copy of an equivalency certificate addressing batteries on a pallet at: (<http://www.tc.gc.ca/tdg/permits/htm/8334-eng.htm>).

Safety Marks

Safety marks are labels, placards, UN numbers and package markings. They are described in Part 4 of the TDG Regulations. The consignor is responsible for providing and displaying safety marks on all means of containment carrying dangerous goods [Subsection 4.4(1)]. The carrier is responsible for making sure that the safety marks remain displayed during transport. The carrier is also responsible for providing and displaying or removing the safety marks if the requirements for dangerous goods safety marks change during transport [Subsection 4.5(1)].

Small Means of Containment

A small means of containment has a capacity of 450 litres or less. A small means of containment must display a dangerous goods label(s), the shipping name, the technical name (if applicable) and the UN number of the product (Sections 4.10 to 4.12). A label must be at least 100 mm on each side. If the container is too small or it has an irregular shape, the label can be reduced in size up to a dimension of 30 mm on each side [Subsection 4.7(2)].

The UN number for a dangerous goods label can be placed inside the label or next to the primary class label as shown below [Paragraph 4.8(1)(b)]. If the UN number is inside the label the letters "UN" must be omitted.

Example of Safety Marks for a Small Means of Containment

In this case the product is
BATTERIES, WET, FILLED WITH ACID, electric storage,
UN 2794, Class 8, Packing Group III



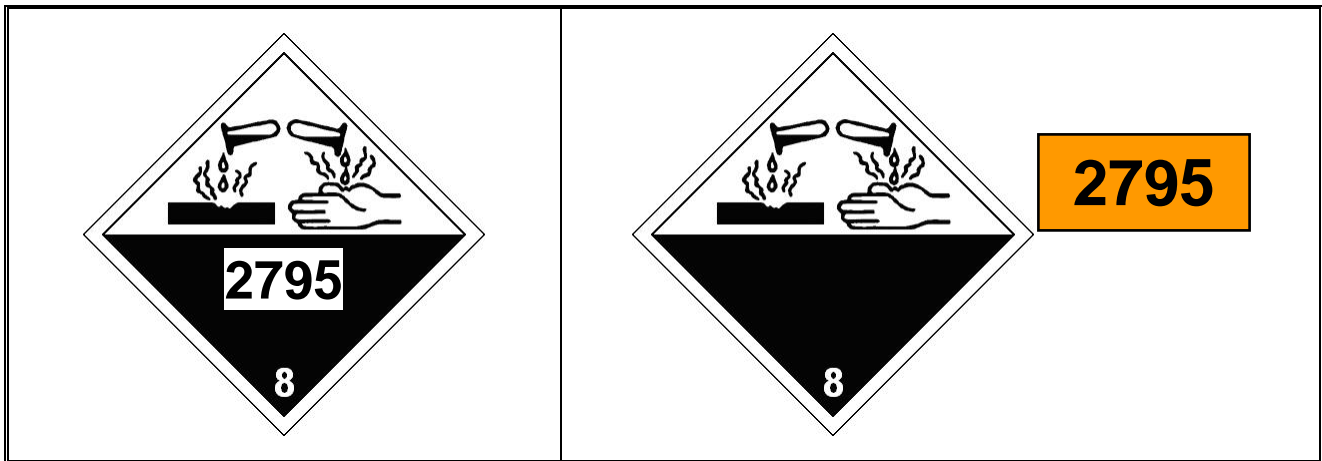
Large Means of Containment

Placards are large safety marks with 250 mm sides. A large means of containment has a capacity greater than 450 litres. A large means of containment carrying battery acid requires placards representing the primary classification and UN number. If the dangerous goods are not in a large means of containment but have a total gross mass greater than 500 kg., the transport unit requires placards [Subsection 4.15(1)]. Placards must be displayed on each side and each end of a large means of containment. The placards may be displayed on the frame of the means of transport or the frame permanently attached to the large means of containment. The placard may also be placed at the front of a truck, instead of on the leading end of a trailer unit of the truck [Subsection 4.15(3)].

The UN number of the dangerous goods being transported in a large means of containment must be displayed in black numerals not less than 65 mm high inside the placard or on an orange panel next to the placard. The letters "UN" are always omitted [Subsection 4.8(2)].

Example of Safety Marks for a Large Means of Containment

In this case the product is
BATTERIES, WET, FILLED WITH ALKALI, electric storage,
UN 2795, Class 8, Packing Group III



Training

Anyone who handles, offers for transport or transports dangerous goods must be adequately trained and have a valid Dangerous Goods Training Certificate or must be under the direct supervision of a trained person (Subsection 6.1). A person is adequately trained if the person has sound knowledge of the topics listed below that relate directly to the person's duties and to the dangerous goods the person is expected to handle, offer for transport or transport (Section 6.2):

- classification of dangerous goods, shipping names, UN numbers, packing groups;
- shipping documentation;
- safety marks;
- certification safety marks, safety requirements and safety standards;
- emergency response assistance plan requirements;
- reporting requirements;
- safe handling and transportation practices;
- proper use of equipment; and
- emergency measures to take in case of an accidental release.

The employer must issue a training certificate when he/she has reasonable grounds to believe that an employee is adequately trained and will perform duties to which the training relates. A training certificate must have the following information (Section 6.3):

- the name and address of the employer,
- the name of the employee,
- the date when the training certificate expires, 36 months after being issued,
- the aspects of handling, offering for transport or transporting dangerous goods for which the employee is trained, and
- the signatures of the employer and the employee.

Self-employed people can issue training certificates for themselves. The employer or self-employed person must keep a record of training or a statement of experience and a copy of his/her training certificate beginning on the date the training certificate is issued and

continuing until two years after the date it expires (Section 6.6). The training certificate must be immediately presented to an inspector who requests for it (Section 6.8).

Accidental Releases of Dangerous Goods

In the event of an accidental release or an imminent accidental release of dangerous goods, the person who has possession of the dangerous goods must make a report immediately. An immediate report is required when the quantities of batteries or battery fluids released exceed 5L or 5 kg (Section 8.1), or for any imminent accidental release of dangerous goods. For more information on reporting requirements, request the CIC information bulletin entitled Reporting an Accidental Release of Dangerous Goods.

In Alberta, the report must be made to:

- the local police,
- Alberta Transportation, Dangerous Goods and Rail Safety Branch at 1-800-272-9600,
- the person's employer,
- the consignor of the dangerous goods, and
- the owner, lessee or charterer of the road vehicle involved.

Note:

The following document is included with this bulletin:

- A sample of a Dangerous Goods Shipping Document for Road Transport

You can obtain an Alberta Environment Recycle Docket and attachment to the Recycle Docket at:

<http://www.environment.alberta.ca/01140.html>

DANGEROUS GOODS SHIPPING DOCUMENT FOR ROAD TRANSPORT

DESTINATION (City-Town) Name: Address:			CONSIGNOR Name: Address:				
Name of Carrier		Prepaid <input type="checkbox"/>	Collect <input type="checkbox"/>	Transport Unit Number			
Point of Origin			Shipping Date		Shipper's No.		
REGULATED DANGEROUS GOODS			24-Hour Number: ERAP Reference _____ and Telephone Number _____				
Shipping Name	Primary Class	Subsidiary Class	UN Number	Packing Group	Quantity	Packages Requiring Labels	
This is to certify that the above named articles are properly classified, described, packaged, marked and labeled and are in proper condition for transportation according to the <i>Transportation of Dangerous Goods Regulations</i> .							
Special Instructions							
NON-REGULATED GOODS							
Packages	Description of Articles			Weight			
Received in apparent good order				_____ Consignee Signature		_____ Shipper's Signature	
Received in Apparent Good Order		_____ Driver's Signature			_____ Driver's No.		

Please note that this sample shipping document contains some information that is not required in the TDG Regulations. The additional information reflects current industry practices.