



Dangerous Goods and Rail Safety

**A Technical Publication from
ALBERTA EDGE (ENVIRONMENTAL AND
DANGEROUS GOODS EMERGENCIES)**

Transportation of Nitrogen by Road

January 2018

Alberta 

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. Alberta EDGE (Environmental and Dangerous Goods Emergencies) of Alberta Transportation can provide accurate information regarding the Regulations 24 hours a day.

Alberta EDGE (Environmental and Dangerous Goods Emergencies)

**Alberta Transportation
Dangerous Goods and Rail Safety
Main Floor, Twin Atria Building
4999 – 98 Avenue
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 Regulatory Compliance Officer responding to your call or contact the Manager of Alberta EDGE at 780-427-8660. *Legal Authority: Dangerous Goods Transportation and Handling Act, Section 13(1).*

GENERAL

Liquid nitrogen and compressed nitrogen are regulated for transportation by the Transportation of Dangerous Goods (TDG) Regulations. Nitrogen is often transported at low pressures in a small means of containment (capacity of 450 litres or less) or a large means of containment (capacity greater than 450 litres).

To determine the complete requirements for transporting this product you must consult the TDG Regulations. Assistance can be obtained by calling Alberta EDGE of Alberta Transportation at 780-422-9600 (in Edmonton) or 1-800-272-9600 (in Alberta).

CLASSIFICATION

According to Section 2.14 of the TDG Regulations, Class 2.2, Non-flammable and Non-toxic Gases, consists of gases that are transported at an absolute pressure greater than or equal to 280 kPa at 20 °C, or as refrigerated liquids, and that are not included in Class 2.1, Flammable Gases, or Class 2.3, Toxic Gases. Nitrogen has a boiling point of -196 °C.

Liquid nitrogen is often used as a coolant for other regulated and non-regulated products.

Shipping Name	NITROGEN, REFRIGERATED LIQUID
Class	2.2
UN number	UN1977
Packing Group	None

Compressed nitrogen is commonly used as a welding gas.

Shipping Name	NITROGEN, COMPRESSED
Class	2.2
UN number	UN1066
Packing Group	None

EXEMPTIONS

The transportation of nitrogen in a small means of containment (a cylinder that has a capacity of 450 litres or less) may be exempt under the following sections of the TDG Regulations:

150 kg Gross Mass Exemption (Section 1.15)

The nitrogen is exempt from documentation, dangerous goods safety marks, dangerous goods training, and accidental release and imminent accidental release reporting requirements if it is transported in one or more small means of containment on a road vehicle, a railway vehicle or a ship on a domestic voyage if

- (a) the means of containment is in compliance with the requirements for transporting gases in Part 5 of the TDG Regulations; and
- (b) the gross mass of all dangerous goods transported on the road vehicle or the railway vehicle, or a ship on a domestic voyage, is less than or equal to 150 kg.
- (c) the dangerous goods are in a quantity or concentration available to the general public and are transported by a user or purchaser of the dangerous goods or by a retailer to or from a user or purchaser of the dangerous goods.

Class 2, Gases, in Small Means of Containment Exemption (Section 1.32.3)

Compressed nitrogen is exempt from documentation and dangerous goods training requirements if it is transported in one or more small means of containment on a road vehicle solely on land if

- (a) the dangerous goods are UN 1066, NITROGEN, COMPRESSED;
- (b) the dangerous goods are contained in no more than five small means of containment;
- (c) the gross mass of the dangerous goods is less than or equal to 500 kg; and
- (d) the labels displayed on the small means of containment can be seen from outside the road vehicle.

500 kg Gross Mass Exemption (Section 1.16)

Part 3 (Documentation), Part 4 (Dangerous Goods Safety Marks) and Part 5 (Means of Containment) do not apply to the handling, offering for transport or transporting of dangerous goods on a road vehicle, a railway vehicle or a ship on a domestic voyage.

- (a) If the dangerous goods included in Class 2, Gases, they are in one or more small means of containment in compliance with the requirements for transporting gases in Part 5, Means of Containment.
- (b) The gross mass of all dangerous goods is less than or equal to 500 kg.
- (c) Each means of containment (or cylinder) has displayed on one side, other than a side on which it is intended to rest or to be stacked during transport, the dangerous goods safety marks required by Part 4, Dangerous Goods Safety Marks.

- (d) The dangerous goods are accompanied by a shipping document or document in accordance with the requirements for location of a shipping document in sections 3.7 to 3.9 of Part 3,
- (e) Documentation; and the shipping document, includes the following information in the following order:
 - I. the primary class of the dangerous goods, following the word "Class", and
 - II. the total number of means of containment, on which a dangerous goods safety mark is required to be displayed, for each primary class, following the words "number of means of containment".

DOCUMENTATION

The shipper must provide the initial documentation and the carrier must ensure that it is correct [Section 3.1 and 3.2].

The carrier must provide the consignee with a copy of the document [Section 3.2(6)].

The consignor and carrier must retain a copy of the shipping document for two years [Section 3.11]. There is no requirement for the consignee to retain a copy of the document.

Dangerous Goods Shipping Document

A dangerous goods shipping document is shown on page 9. This document may be used for any shipment of nitrogen. According to Section 1.4 of the Transportation of Dangerous Goods Regulations, the definition of the shipping document must be in paper format, electronic format is not acceptable.

Multiple Collections and Deliveries

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 means of containment [Section 3.5(5)].



How the carrier shows the change in quantity is the carrier's choice. The carrier can change the number used to express quantity or may mark on the shipping document, or on a document attached to the shipping document, the additions to or the subtractions from the number used to express quantity.

SAFETY MARKS




The consignor (shipper) is responsible for providing all safety marks to the carrier [Section 4.4]. The carrier must ensure that they are correct [Section 4.5].

All small means of containment of liquid nitrogen (UN1977) or compressed nitrogen (UN1066) must have at least the following information on each container:

- Class 2.2 [Section 4.10]
- the shipping name [Section 4.11]
- the UN number (the UN number can also be on the label) [Section 4.12]

Example of a Safety Marks for a Small Means of Containment		
	<table border="1"><tr><td>NITROGEN, REFRIGERATED LIQUID</td></tr></table>	NITROGEN, REFRIGERATED LIQUID
NITROGEN, REFRIGERATED LIQUID		
	<table border="1"><tr><td>UN1977 NITROGEN, REFRIGERATED LIQUID</td></tr></table>	UN1977 NITROGEN, REFRIGERATED LIQUID
UN1977 NITROGEN, REFRIGERATED LIQUID		
The Class 2.2 safety label is green with a white cylinder symbol		

All large means of containment, including a vehicle acting as a large means of containment, must be clearly marked with four Class 2.2 placards, one on each of the four sides of the large means of containment or vehicle [Section 4.15]. The UN number must be shown inside each placard or on an adjacent orange panel [Section 4.8].

Example of Safety Marks for a Large Means of Containment	
	 
The Class 2.2 placard is green with a white cylinder symbol	

TRAINING

Anyone who handles, offers for transport or transports nitrogen must be trained or work under the direct supervision of a trained person unless an exemption applies. An employer issues a dangerous goods training certificate when the employer is satisfied that the training is adequate. The training certificate may be in paper or electronic format. Section 6.3 of the TDG Regulations lists the information required on the certificate. The certificate is valid for a maximum of three years from the date of issuance [Section 6.5(b)].

The employer must retain a copy of the certificate for at least two years after the certificate has expired [Section 6.6].

REPORTING

In the event of a release or anticipated release of NITROGEN, Class 2.2, dangerous goods (herein referred to as an event), the person in possession of the dangerous goods at the time of the event must make an Emergency Report to the local authorities as soon as possible. An emergency report is required when any quantity of dangerous goods that was released or for any potential release. For more information on reporting requirements, request Alberta EDGE information bulletin entitled Emergency, Release or Anticipated Release Report Requirements.

A local authority is any organization which may be responsible for emergency response at the location of the release or anticipated release. In Alberta, these include:

- the local police or RCMP, and
- Alberta EDGE



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24 hour toll free service, call
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Edmonton area: 780-422-9600

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The person making the Emergency Report must also make a Release or Anticipated Release Report as per Section 8.4 to CANUTEC (1-888-226-8832 or 613-996-6666) if:

- a fatality occurred;
- there were any injuries caused by exposure to the dangerous goods which required medical treatment by a health care provider;
- an evacuation occurred or people sheltered in place;
- a loading or unloading facility, road, main rail line or main waterway was closed;
- the container became damaged enough to compromise its integrity; or
- the centre sill or stub sill of a tank car was broken or there is a crack in the metal equal to or greater than 15 cm (6 in.)

If a report is required to CANUTEC, the person must also report the incident to the consignor of the dangerous goods.

The information that must be included in the Emergency or Release or Anticipated Release Report is:

- the name and contact information of the person making the report;
- the date, time and location of the event;
- the mode of transport used (including a description of the container);

- the shipping name or UN number of the dangerous goods;
- the quantity of dangerous goods initially in the container;
- the quantity of dangerous goods released (if applicable);
- the type of incident leading to the event (for example: collision, roll-over, derailment, overfill, fire, explosion or load-shift);
- the name and geographic location of any road, main railway or main waterway that was closed (if applicable);
- the number of people evacuated or sheltered in place (if applicable); and
- the number of fatalities or injures (if applicable).

A report can also include other information not required by the regulations (for example, any cleanup arrangements, or involvement of other emergency response agencies like the police, fire department, Alberta Environment and Parks or the Alberta Energy Regulator).

After submitting a Release or Anticipated Release report to CANUTEC, the person or employer of the person who made the report must submit a 30-day follow-up report to the Dangerous Goods Directorate of Transport Canada [Section 8.6]. The 30-Day Follow-up Report must include the following information:

- name and contact information of the person submitting the report;
- date, time and location of the event;
- names and contact information of the consignor, carrier and consignee;
- the mode of transport;
- classification of the dangerous goods;
- quantity of dangerous goods in the container before the event occurred;
- the quantity of dangerous goods released (if applicable)
- a description of the container involved and a description of the failure or damage including how the event occurred;
- information about the conditions leading to the event;
- information on any fire or explosion (if applicable);
- the name and location of any facility that was closed, and the duration of the closure;
- the name and location of any road, main railway line or main waterway that was closed, and the duration of the closure
- number of deaths and injuries (if applicable);
- an estimate of the number of people evacuated, if any; and
- the ERAP reference number (if applicable);
- the date the initial verbal report was made; and
- an estimate of the financial loss as a result of the release/anticipated release and any associated, emergency response or remediation.

A 30 day report must be kept for two years after the day which it was made. They must make the report available to an inspector within 15 days after the day on which the person receives a written request from the inspector [Section 8.8].

Attachment: Sample Dangerous Goods Shipping Document for Road Transport

DANGEROUS GOODS SHIPPING DOCUMENT FOR ROAD TRANSPORT

CONSIGNOR Name: Address:			DESTINATION (City-Town) 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						
UN Number	Shipping Name	Primary Class	Subsidiary Class	Packing Group	Quantity	Packages Requiring Labels
24-Hour Number: _____						
ERAP Reference _____ and Telephone Number _____						
Consignor's Certification						
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, are properly classified and packaged, have dangerous goods safety marks properly affixed or displayed on them, and are in all respects in proper condition for transport according to the Transportation of Dangerous Goods Regulations.						
Name of Consignor: _____						
Special Instructions						
NON-REGULATED GOODS						
Packages	Description of Articles			Weight		
Received in apparent good order				_____ Consignee's 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.