

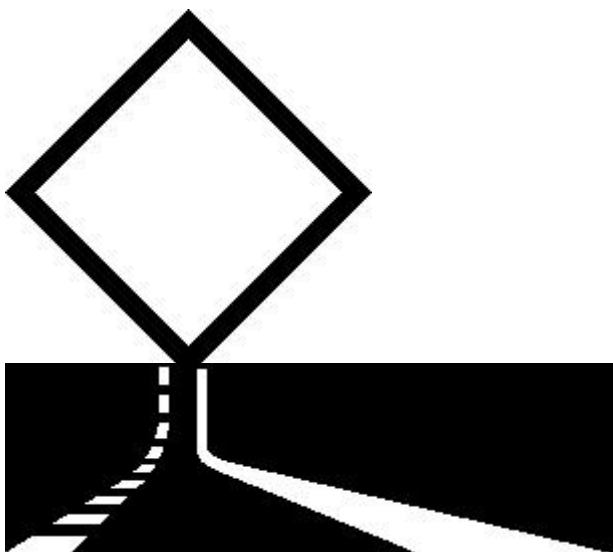
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**A Technical Publication
from the Co-ordination
and Information Centre**

Transportation of Molten Sulfur by Road

November 2009

**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
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 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 bulletin has been produced to assist molten sulphur shippers, carriers and receivers in complying with the Transportation of Dangerous Goods (TDG) Regulations. Molten sulphur cannot be shipped as Limited Quantity and is forbidden to be transported on a passenger carrying vehicle, such as a bus.

CLASSIFICATION OF MOLTEN SULPHUR

In order to transport sulphur in a molten state the temperature must be kept very hot; therefore, molten sulphur is classified as a flammable solid.

Shipping Name	Class	UN Number	Packing Group
MOLTEN SULPHUR; MOLTEN SULFUR; SULFUR, MOLTEN; or SULPHUR, MOLTEN	4.1	UN2448	III

SPECIAL PROVISION

Schedule 2, Special Provision 32 of the TDG Regulations provides an exemption for the transportation of molten sulphur which states:

These Regulations, **except Part 3 (Documentation)**, do not apply to these dangerous goods if they are transported by road vehicle or railway vehicle in a large means of containment and

- a. the large means of containment is in standard with CAN/CSA-B621 for transport by road vehicle or with CAN/CGSB-43.147 for transport by railway vehicle; and

NOTE: The container may be a non-specification container that meets the general requirements of Clause 4 of B621.

- b. the road or railway vehicle is marked on each side, in letters and numerals that are at least 6 mm wide and 100 mm high, with
 - (i) the letters and numerals UN2448, or
 - (ii) the numerals 2448 and the words MOLTEN SULPHUR, MOLTEN SULFUR or SOUFRE FONDU.

If you do not want to use the exemption above, you must fully comply with the TDG Regulations as described in the following pages.

SHIPPING DOCUMENT

It is the responsibility of the consignor to prepare a proper shipping document when offering dangerous goods for transportation [Section 3.1]. The document is similar to a standard bill of lading but must contain information needed to describe the dangerous goods. The shipping document is handed over to the initial carrier and must accompany the consignment throughout its journey. The consignor and each carrier that transported shall retain a copy of the shipping document for a period of two years [Section 3.11].

The following is the minimum required information which must appear on a shipping document for molten sulphur (according to Special Provision 32):

1. Name and address of consignor
2. Date the shipping document was prepared
3. Description of the dangerous goods in the following order
 - a. Shipping name: MOLTEN SULPHUR
 - b. Primary classification: 4.1
 - c. UN number: UN2448
 - d. Packing Group: III
 - e. The quantity in the International System of Units (SI) ^{1,2}
 - f. The number of containers for dangerous goods in small containers requiring safety labels ²
4. The words "24-Hour Number" followed by a telephone number where the consignor can be easily reached ³

Note:

1. If the quantity of dangerous goods is less than 10% of the container's capacity 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 [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)].

SAFETY MARKS

Safety marks are the signs, labels and markings which are required by the TDG Regulations. The requirements are described in Part 4 of the Regulations. The **consignor** (shipper) must ensure that each package of dangerous goods is properly labeled and marked and that all necessary placards are provided. It is the consignor's responsibility to provide the safety marks to the carrier [Section 4.4].

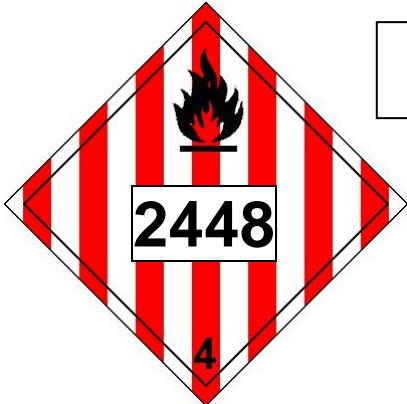
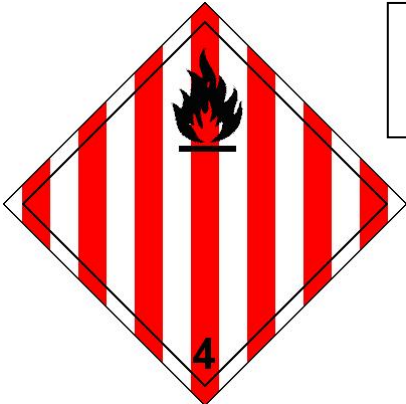
The **carrier** is responsible for displaying the required safety marks on the large means of containment and ensuring that the required safety marks remain displayed on the small means of containment and the large means of containment. The carrier must also provide, display or remove the safety marks if the requirements for them change while in transport. [(Section 4.5)].

Small Means of Containment

A small means of containment has a capacity of 450 litres or less. A small means of containment must display the dangerous goods label(s), the shipping name and the UN number of the product [Sections 4.10 to 4.12]. The label is 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 [Section 4.7(2)]. If the label is reduced in size to 30 mm, the label may be displayed on a tag affixed to the means of containment [Section 4.10(4)]. If the label is displayed on a tag, the shipping name and UN number must also be displayed on the tag [Sections 4.11(3) and 4.12(2)].

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

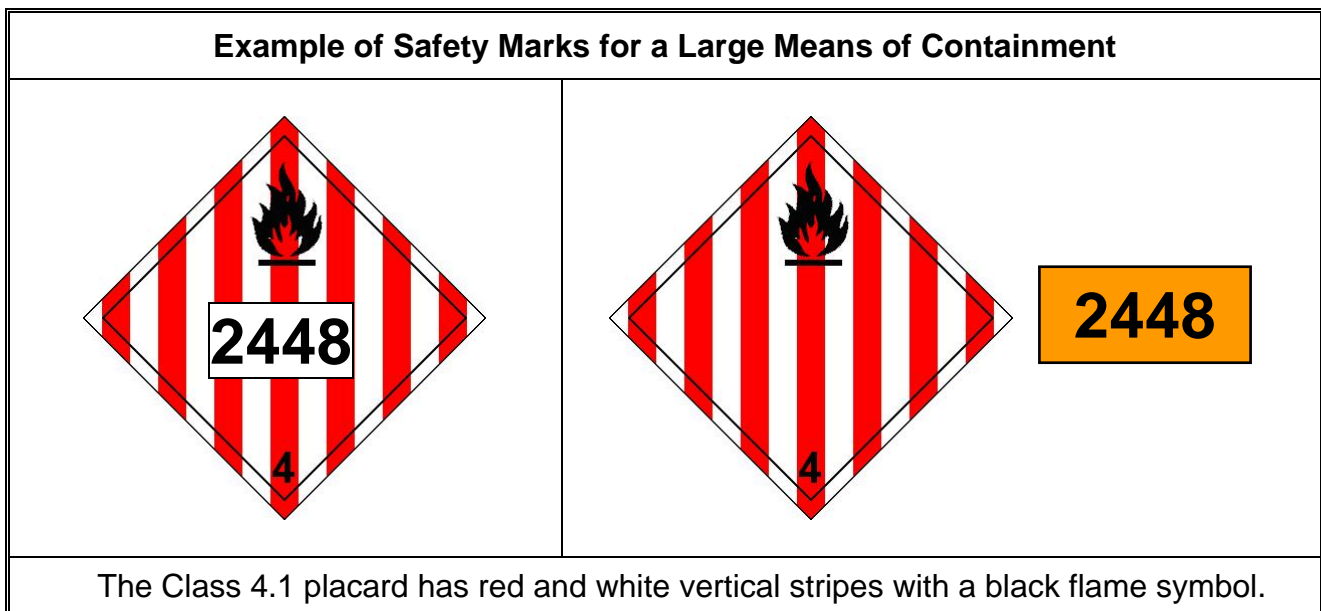
Example of Safety Marks for a Small Means of Containment	
	
The Class 4.1 safety label has red and white vertical stripes with a black flame symbol.	

Large Means of Containment

Placards are larger safety marks with at least 250 mm sides. A large means of containment has a capacity greater than 450 litres and it can be a container such as a bulk tank. According to Section 4.15(1) a large means of containment loaded with molten sulphur requires placards representing the primary classification if the dangerous goods have a total gross mass greater than 500 kg.

The 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 [Section 4.15(3)].

The UN number of the dangerous goods being transported must be displayed inside the placard or on an orange panel next to the placard. The letters "UN" are always omitted [Section 4.8(2)].



Transportation of molten sulphur will NOT require the prescribed Class 4.1 placards if conditions listed in Special Provision 32 of Schedule 2 of the TDG Regulations are met. For details, please refer to the special provision section of this bulletin (page 3).

TRAINING

Unless there is an exemption under the TDG Regulations, 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 [Section 6.1].

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 it [Section 6.8].

Note: If Special Provision 32 (see page 3) applies, then a training certificate is not required.

ACCIDENTAL RELEASE OF DANGEROUS GOODS

In the event of an accidental release or imminent accidental release of dangerous goods, the person who has possession of the dangerous goods must report immediately. In the case of molten sulphur an immediate report is required when the release involves **release of 25 Kg or more [Section 8.1] or if there is an imminent accidental release.**

In Alberta, the report must be made to the local police and the provincial authority. The provincial authority is Alberta Transportation, Dangerous Goods and Rail Safety Branch, at 1-800-272-9600.

For the full reporting requirements, refer to the CIC Bulletin entitled Reporting an Accidental Release of Dangerous Goods. A copy can be obtained by calling the Co-ordination and Information Centre at 1-800-272-9600.

Note: If Special Provision 32 (see page 3) applies, then the reporting of an accidental release is not required.

TANK STANDARDS

Section 8.4 of Standard CAN/CSA-B621 states that the means of containment used to transport molten sulphur

- (a) may be a non-specification means of containment that complies with the general requirement in Clause 4 of the same standard, if the combined vapour pressure of the product and any padding is less than 200 kPa (29 psia) (absolute) at 46 °C; or
- (b) shall be TC 407, TC 412 or TC 331 tanks having a minimum Maximum Allowable Working Pressure of 172 kPa, gauge (25 psig).

Clause 4 of CAN/CSA-B621 prescribes general requirements as follows:

All primary means of containment used for the transportation of dangerous goods shall be

- (a) water-tight and constructed so that neither rain nor road spray can come into contact with the dangerous goods;
- (b) dust-proof, sift-proof and constructed so that the dangerous goods are securely retained in the means of containment under normal conditions of transport;
- (c) constructed of impermeable, non-absorbent materials that will not be corroded by the lading;
- (d) designed to facilitate cleaning and decontamination;
- (e) where the dangerous goods are liquid, leak-free and designed for the transport of liquids; and
- (f) capable of withstanding any internal pressure likely to be encountered under normal conditions of transport, without any permanent deformation or leaks.

Those parts of the means of containment and accessories that contact the dangerous goods shall be constructed of a material that is:

- (a) appropriate for the temperature of the material being transported; and
- (b) one of the following:
 - (i) resistant to deterioration by the goods being transported
 - (ii) passivated or otherwise treated to reduce the rate of deterioration so that any minimum thickness required is maintained during transportation; or
 - (iii) lined with a nonporous, imperforate material resistant to deterioration by the goods being transported and that has a thermal expansion and elasticity characteristics compatible with those of the material of construction of the means of containment.

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 labelled 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.