CSA Group

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Selection and use of highway tanks, TC portable tanks, and other large containers for the transportation of dangerous goods, Classes 3, 4, 5, 6.1, 8, and 9

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Title: *Selection and use of highway tanks, TCportable tanks, and other large containers for the transportation of dangerous goods, Classes3, 4, 5, 6.1, 8, and 9* — originally published January 2014

The following revisions have been formally approved and are marked by the symbol delta (Δ) in the margin on the attached replacement pages:

Revised	Clauses 7.1 and 8.4
New	None
Deleted	None

- Update your copy by inserting these revised pages.
- Keep the pages you remove for reference.

(c) it is free of any visible defect that could affect its integrity during loading, unloading, or transportation;
(d) if it is a tank, it has a MAWP equal to or greater than that specified in Clause 4.4;
(e) where a fire hazard exists, precautions have been taken to prevent a difference in electrical potential between conductive surfaces and to ensure safe dissipation of static electricity through bonding or grounding, or both, as appropriate;
Δ (f) all flexible hoses and their couplings have been inspected visually to ensure mechanical fitness, integrity, and compatibility with lading. A hose assembly shall not be used to load or unload dangerous goods if it is determined to have any of the conditions identified in Clause 7.2.10.4 of CSA B620-14 or if the markings are not in accordance with Clause 7.2.10.6 or 7.2.10.8 of CSA B620-14. Despite the requirement of Clause 7.2.10.4(a) of CSA B620-14, a hose may continue to be used if the reinforcement is exposed as long as there is no evidence of wear, deterioration, or other damage in the exposed reinforcement;
(g) prior to transport, the gauge glass valves on TC 44 tanks shall be closed and remain closed during transport.
(h) while parked for loading or unloading,
  (i) a fail-safe brake interlock system is used that will apply the parking brake while the loading and unloading hoses are connected; or
  (ii) chock blocks are used at the wheels.
Δ (i) as of 1 Jan 2015, highway tanks and vehicles transporting portable tanks containing Dangerous Goods of primary Class 3, or subsidiary Class 3, shall be equipped with one or more dry chemical fire extinguishers accessible from the ground, with a combined total effective rating of not less than 40BC. Each fire extinguisher shall be recharged immediately after each use and shall be inspected and marked annually in accordance with NFPA 10; and
(j) as of 1 Jan 2016, diesel engines on highway tanks and portable tanks containing Dangerous Goods of primary Class 3, or subsidiary Class 3, and being used during loading or off loading shall be equipped with an automatic engine air intake shut off device that will prevent engine runaway in case of exposure to flammable vapours. The device shall activate automatically if engine runaway is detected and remain activated until manually reset.

7.2 Pre-loading requirements

In addition to the requirements in Clause 7.1, a means of containment shall not be loaded with dangerous goods unless the following conditions are fulfilled:
(a) it has been inspected, tested, retested, and is marked as required for its specification (see Clause 5.4);
(b) if it is a tank, and a component such as piping, a valve, or a fitting has been restored or replaced since the last time the tank was loaded or unloaded, that component has been tested for leaks at 80% of MAWP;
(c) it does not contain any residues or foreign materials that could react with the intended lading or otherwise create a hazard;
(d) those parts that contact the intended lading will not react with the lading or cause the lading to decompose and thereby create a hazard; and
(e) if the mixture of two or more materials would result in a direct or indirect hazard (such as an explosion, fire, excessive increase in pressure or heat, or the release of toxic vapours), precautions shall be taken to ensure that a highway tank vehicle is not loaded with those materials unless the materials are separated by a double bulkhead.

7.3 Loading requirements

During loading of a means of containment,
(a) The operator responsible for the transfer shall have been trained in product hazards and emergency procedures, and shall remain alert, within easy access of the flow shutdown control, and to the extent possible, with the hose and tank in clear view except for brief periods to operate controls or to check the receiving container.
(b) The loading limits for the means of containment shall not be exceeded, including the rate of filling, the gross vehicle weight, the maximum product load, and the MAWP and vacuum limits.

(c) The quantity of dangerous goods to be transferred shall be controlled.
(d) If the means of containment is a tank, the outage left in the tank shall
    (i) not be less than 2% of its volumetric capacity;
    (ii) be sufficient to prevent the tank from becoming liquid-full should the temperature of the contents rise to 55 °C (131°F); and
    (iii) if the tank is to be placed, stored, or parked within an enclosed space, be sufficient to prevent venting should the temperature of the contents rise to 55 °C (131°F).

7.4 Post-loading requirements

The following requirements shall apply:
(a) Immediately after the means of containment has been loaded
    (i) all hatches, valves up to and including the outermost valve, and other openings in the means of containment shall be closed and secured; and
    (ii) the exterior surfaces shall be clean and free of residue or spills of dangerous goods.
(b) The closing and securement of valves and openings in Item (a) (i) shall not interfere with the normal functioning of any safety relief devices.
(c) Prior to transport, the means of containment shall be secured to the transport vehicle in a manner that will endure the normal conditions of transportation.

7.5 Pre-unloading requirements

In addition to the requirements in Clause 7.1, prior to unloading a means of containment, the following conditions shall be fulfilled:
(a) unloading connections shall be inspected to ensure that the lading will be discharged into the proper receiving line;
(b) precautions shall be taken to isolate from each other substances that can react violently together, if such substances are to be unloaded simultaneously at the same location;
(c) the space available in the receiving means of containment shall be verified to ensure that it is sufficient to accommodate the quantity of goods to be unloaded; and
(d) if the periodic inspection or test interval has expired since the tank was last loaded, the tank may be transported to its unloading destination and unloaded.

7.6 Unloading requirements

During the unloading of a means of containment,
(a) The operator responsible for the transfer shall have been trained in product hazards and emergency procedures, and shall remain alert, within easy access of the tank flow shutdown control, and to the extent possible, with the hose and tank in clear view except for brief periods to operate controls or to check the receiving container.
(b) When the easy access and clear view referred to in Item (a) is not possible, the operator shall remain within easy access of another means of shutting off the flow except to check the supply connection, the hose, and the receiving tank at least once every five minutes for operations that last more than five minutes.
(c) The loading and unloading limits for the delivering and receiving means of containment shall not be exceeded, including the rate of filling, the gross vehicle weight, the maximum product load, and the MAWP and vacuum limits.
(d) The quantity of dangerous goods unloaded shall be controlled.

7.7 Post-unloading requirements

The following requirements shall apply:
(a) Immediately after the means of containment has been unloaded
    (i) all hatches, valves up to and including the outermost valve, and other openings in the means of containment shall be closed and secured; and
    (ii) the exterior surfaces shall be clean and free of residue or spills of dangerous goods.

(b) The closing and securement of valves and openings in Item (a) (i) shall not interfere with the normal functioning of any safety relief devices.

The requirements in Item (a) shall not apply if the means of containment is cleaned and purged immediately after unloading.

8 Tank selection requirements for dangerous goods of Classes 3, 4, 5, 6.1, 8, and 9

8.1 Classification, prohibition, and exemption under the *TDG Act* and *Regulations*

Clause 8 provides tank selection requirements for the handling, offering for transport, and transportation of dangerous goods of Classes 3, 4, 5, 6.1, 8, and 9 that are neither prohibited from transportation nor exempted by the *TDG Regulations*.

Notes:

(1) *Dangerous goods are classified in Part 2 of the* TDG Regulations*. The appropriate shipping name and the corresponding particulars (description, UN number, class, division, and packing group, as applicable) are assigned by Schedule 1 of the* TDG Regulations*.*

(2) *Certain dangerous goods are exempted by the* TDG Regulations*, and others are prohibited from transport by Schedule 3 of the* TDG Regulations*.*

8.2 General tank selection requirements

Dangerous goods shall be transported in

(a) a means of containment that is selected and used in accordance with Clauses 4, 7, 8, and either 5 or 6 of this Standard; or

(b) TC 106A or TC 110A multi-unit tank car tanks (ton containers) or their CTC or DOT equivalents, if the tanks are selected, used, maintained, and periodically inspected and tested as prescribed in CAN/CGSB-43.147.

8.3 Requirements for specific dangerous goods

The Specific Requirements in Clause 8.4, listed in column 6 of Tables 4 and 5, shall apply to specific dangerous goods where

(a) the UN number in column 1 and the shipping name and description in column 2 match those of the dangerous goods; or

(b) if the shipping name and description are not known or not included in either Tables 4 or 5, the general description in bold letters in column 2, the primary classification in column 3, the subsidiary classification in column 4, and the packing group in column 5 match those of the dangerous goods.

8.4 Specific Requirements

Note: *Some Specific Requirements are followed by parentheses containing the letter B and a number. These parenthetical references specify the equivalent Special Provision in §172.102 of CFR 49.*

The following Specific Requirements shall be applied pursuant to Clause 8.3:

1. Tanks shall be TC 407, TC 412, or TC 331 tanks having a minimum MAWP of 276 kPa, gauge (40 psi).
2. Tanks shall be TC 407, TC 412, or TC 331 tanks having a minimum MAWP of 172 kPa, gauge (25 psi).
3. Tanks shall be TC 406, TC 407, TC 412, or TC 331 tanks.
4. A means of containment
   (a) shall be a specification tank listed in Specific Requirement 3;
   (b) shall be a specification tank listed in Specific Requirement 2 if the combined vapour pressure of the product and any padding is greater than or equal to 200 kPa (29 psia) (absolute) at 46 °C (115°F); and

(c) despite Item (a), may be a non-specification means of containment that complies with the requirements in Clause 4 if
   (i) the capacity of the means of containment is greater than 3000 L; and
   (ii) the tank is leak free and suitable for the transport of liquids.

5. A means of containment
   (a) shall be a specification tank listed in Specific Requirement 3;
   (b) shall be a specification tank listed in Specific Requirement 2 if the combined vapour pressure of the product and any padding is greater than or equal to 200 kPa (29 psia) (absolute) at 46 °C (115°F); and
   (c) despite Item (a), may be a non-specification means of containment that complies with the requirements in Clause 4 if the capacity of the means of containment is greater than 3000 L.
6. Tanks shall not be loaded at ambient temperatures and lading temperatures exceeding those listed in column 1 of Table 3 in accordance with the volatility of the ladings (see column 2).(B33)

Table 3
Loading specifications
(See Specific Requirement 6.)

Column 1	Column 2
Maximum lading and ambient temperature	**Volatility**
55.0 °C (131°F)	RVP ≤61.8 kPa (9.0 psia)
51.1 °C (124°F)	RVP ≤68.7 kPa (10.0 psia)
46.7 °C (116°F)	RVP ≤79.0 kPa (11.5 psia)
41.7 °C (107°F)	RVP ≤92.8 kPa (13.5 psia)
37.8 °C (100°F)	RVP ≤103.1 kPa (15.0 psia)

Note: *RVP refers to the Reid vapour pressure.*

7. Tanks shall be
   (a) TC 407, TC 412, or TC 331 tanks having a minimum MAWP of 172 kPa, gauge (25 psi); and
   (b) designed for a working temperature of at least 121 °C (250°F). (B5)
8. Tanks shall
   (a) be TC 407, TC 412, or TC 331 tanks having a minimum MAWP of 1207 kPa, gauge (175 psi);
   (b) not be equipped with bottom outlets; and
   (c) be insulated so that the overall thermal conductance at 15.5 °C (60°F) is not more than 1.5333 kJ/h•m^2/°C (0.075 Btu/h•ft^2/°F). (B11)

Δ 9. Tanks shall be
   (a) TC 406 Crude, TC 406, TC 407, TC 412, or TC 331 tanks; or
   (b) TC 306 or MC 306 tanks that meet the requirements of Clause A.9 of CSA B620-14;
10. Tanks shall contain a padding composed only of nitrogen, inert gas, or other inert material. (B16)
11. Open bins shall be authorized for iron oxide, spent, or iron sponge, spent (obtained from coal gas purification), UN1376. (B18)
12. Tanks shall
   (a) comply with Specific Requirement 2;
   (b) be insulated with at least 100 mm (4 in) of insulation, except that the insulation may be reduced to 51 mm (2 in) over exterior heater coils;
   (c) not be equipped with interior heating coils;
   (d) contain a padding composed only of inert gas, or be filled with water to the tanks' capacity; and
   (e) not be loaded with dangerous goods at a temperature above the tank's design temperature range. (B26)

Standards Update Service

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Selection and use of highway tanks, TC portable tanks, and other large containers for the transportation of dangerous goods, Classes 3, 4, 5, 6.1, 8, and 9

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Contents

Tables

Technical Committee on Highway Tanks and TC Portable Tanks for the Transportation of Dangerous Goods

D. Ferguson	Goldec-Hamm's Manufacturing Ltd., Red Deer, Alberta	*Chair*
D. Stainrod	D.J. Stainrod & Associates Ltd., Bowmanville, Ontario	*Vice-Chair*
F. Afshar	B&M Risk Advice Inc., Markham, Ontario	*Associate*
J. Albrechtsen	Paul's Hauling Ltd., Winnipeg, Manitoba	
R. Bahia	Trimac Transportation Services, Calgary, Alberta	
R. Baker	Cryogenic Vessel Alternatives, Lafayette, Indiana, USA	
S. Bartlett	Air Products and Chemicals Inc., Allentown, Pennsylvania, USA	*Associate*
R. Boies	Gouvernement du Québec Ministère des Transports, Québec, Québec	
A. Bourgault	Gestion Robgroup Inc., Chambly, Quebec	
G. Buck	Pro-Par (1978) Inc., Sherbrooke, Québec	
L. Burns	Orica Mining Services, Calgary, Alberta	*Associate*
R. Campbell	Advance Engineered Products Limited, Regina, Saskatchewan	*Associate*
G. Caron	Gibson Energy Ltd., Edmonton, Alberta	
D. Chaplow	Ball Truck and Auto Repair, St. Thomas, Ontario	*Associate*
A. Chatillon	Tankcon FRP Inc., Blainville, Québec	
P. Chilukuri	Cusco Fabricators, Inc., Richmond Hill, Ontario	*Associate*

L. Comtois	Trimac Transportation Services, Kirkland, Québec	*Associate*
J. Conley	National Tank Truck Carriers Incorporated, Alexandria, Virginia, USA	*Associate*
M. Denys	ABSA, Edmonton, Alberta	
G. Dickson	LaSalle, Manitoba	*Associate*
R. Dolyniuk	Manitoba Trucking Association, Winnipeg, Manitoba	*Associate*
P. Dubois	Service Remtec Inc., Point-aux-Trembles, Québec	*Associate*
B. Durstling	Gibson Energy Ltd., Edmonton, Alberta	*Associate*
A. Eleniak	Xtreme, Sylvan Lake, Alberta	
T. Hagglund	Prosolve Consulting Ltd., Edmonton, Alberta	*Associate*
J. Harpin	Alberta Transportation, Edmonton, Alberta	*Associate*
W. He	Sino-Can Energy, Richmond Hill, Ontario	*Associate*
C. Hochman	U.S. Department of Transportation, Washington, DC, USA	*Associate*
Y. Huang	Royal & SunAlliance Insurance Company of Canada, Toronto, Ontario	
J. Huby	Dixon Group Canada Ltd., Innisfil, Ontario	*Associate*
C. Hughes	Transportation Technical Resources Ltd., Calgary, Alberta	
S. Katz	S. Katz and Associates Inc., North Vancouver, British Columbia	*Associate*
C. Kirk	Tremcar Technologies Inc., St-Jean-sur-Richelieu, Québec	*Associate*
R. Lalonde	Praxair Canada Inc., St-Laurent, Québec	
S. Lam	Technical Standards & Safety Authority, Toronto, Ontario	*Associate*

R. Lloyd	Performance Industries Project and Consulting, Red Deer, Alberta	*Associate*
T. MacLean	Transport Canada, Ottawa, Ontario	*Associate*
N. Malone	Canadian Association of Oilwell Drilling Contractors, Calgary, Alberta	*Associate*
J. Meryo	Amko Service Co., Midvale, Ohio, USA	
A. Mohammed	Ensign Energy Services, Nisku, Alberta	*Associate*
B. Montague	Erleigh Associates, Burlington, Ontario	*Associate*
D. Moore	Canadian Transportation Equipment Association, St. Thomas, Ontario	*Associate*
M. Mullin	Alberta Transportation, Edmonton, Alberta	
M. Natale	Dependable Truck & Tank Ltd., Brampton, Ontario	*Associate*
C. Nowak	Transport Canada, Ottawa, Ontario	
J. Olson	Olsen Logistics, Nisku, Alberta	
R. Opersko	Air Products Canada Limited, Nanticoke, Ontario	
A. Paaren	Tremcar Technologies Inc., Toronto, Ontario	
A. Park	Compressed Gas Association, Ottawa, Ontario	
R. Reid	Reid Engineering Services, Calgary, Alberta	
T. Rishel	Maxfield Inc., Crossfield, Alberta	*Associate*
T. Rogers	Container Technology Inc., Anton, Texas, USA	*Associate*
D. Savard	Innocar Inc., Lavaltrie, Québec	*Associate*
M. Shah	Technical Safety Authority of Saskatchewan, Regina, Saskatchewan	*Associate*

M. Skinner	Infrastructure Health and Safety Association, Mississauga, Ontario	*Associate*
G. Snider	Heavy Crude Hauling Ltd., Lloydminster, Alberta	*Associate*
E. Snoeberger	Alloy Custom Products, Lafayette, Indiana, USA	*Associate*
G. Stewart	Seaboard / Harmac, North York, Ontario	*Associate*
R. Strelic	Advance Engineering Products Limited, Regina, Saskatchewan	
C. Turylo	Technical Standards & Safety Authority, Toronto, Ontario	
J. Van Benthem	TE Designs, Calgary, Alberta	*Associate*
G. Vincent	Bedard Tankers, Montréal, Québec	
W. Widla	Fulton Engineered Specialties Inc., Caledon, Ontario	*Associate*
F. Zhang	Royal & SunAlliance Insurance Company of Canada, Brampton, Ontario	*Associate*
R. Meyers	CSA Group, Mississauga, Ontario	*Project Manager*

The Technical Committee thanks Kevin Green of Transport Canada (retired) for his contributions to the development of this Standard.

Preface

This is the fifth edition of CSA B621, *Selection and use of highway tanks, TC portable tanks, and other large containers for the transportation of dangerous goods, Classes 3, 4, 5, 6.1, 8, and 9.* It supersedes the previous editions published in 2009, 2003, 1998, and 1987.

This Standard is one of a series of Standards that have been prepared for use in conjunction with the *Transportation of Dangerous Goods Regulations*. It should be noted that this Standard, by itself, does not have the force of law unless it is officially adopted by a regulatory authority. Since the Standard may be adopted into regulations with certain exceptions or additional requirements, it is recommended that the regulations of the relevant jurisdiction be consulted in order to establish the extent to which this Standard has been adopted. Where an industry practice differs from the requirements of this Standard, an application for a permit for equivalent level of safety may be requested from the regulatory authority.

This Standard was prepared giving due consideration to current industry practices in North America, the *US Code of Federal Regulations, Title 49*, and the United Nations publication *Recommendations on the Transport of Dangerous Goods: Model Regulations.* CSA B620-14, *Highway tanks and TC portable tanks for the transportation of dangerous goods,* is the reference document for design, construction, testing, and inspection requirements.

This Standard was prepared by the Technical Committee on Highway Tanks and TC Portable Tanks for Transportation of Dangerous Goods, under the jurisdiction of the Strategic Steering Committee on Mechanical Industrial Equipment Safety, and it has been formally approved by the Technical Committee.

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*

(3) *This Standard was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

(4) *To submit a request for interpretation of this Standard, please send the following information to* ***inquiries@csagroup.org*** *and include "Request for interpretation" in the subject line:*

- *(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;*
- *(b) provide an explanation of circumstances surrounding the actual field condition; and*
- *(c) where possible, phrase the request in such a way that a specific "yes" or "no" answer will address the issue.*

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- *(a) Standard designation (number);*
- *(b) relevant clause, table, and/or figure number;*
- *(c) wording of the proposed change; and*
- *(d) rationale for the change.*

B621-14
Selection and use of highway tanks, TC portable tanks, and other large containers for the transportation of dangerous goods, Classes 3, 4, 5, 6.1, 8, and 9

1 Scope

1.1
This Standard details the requirements for the selection and use, handling, filling, and unloading of highway tanks, TC portable tanks, and other large containers when they are used as a primary means of containment for the transportation of dangerous goods of Classes 3, 4, 5, 6.1, 8, and 9.

1.2
This Standard sets out certain minimum requirements for the selection of the appropriate means of containment for the transportation of dangerous goods. This Standard does not, however, prescribe selection of the materials of construction of the means of containment to ensure chemical compatibility with the dangerous goods. Consequently, it is essential to exercise competent technical and engineering judgment in conjunction with this Standard.

1.3
Where any requirement of this Standard differs from the *Transportation of Dangerous Goods (TDG) Regulations*, the requirements of the *TDG Regulations* apply.

1.4
This Standard does not apply to TC 56, CTC 56, and DOT 56 tanks. Requirements for these tanks are provided in CAN/CGSB-43.146. (See Clause 6.4.)

1.5
This Standard does not apply to TC 57, CTC 57, and DOT 57 tanks. Requirements for these tanks are provided in CAN/CGSB-43.146. (See Clause 6.5.)

1.6
In CSA Standards, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; “may” is used to express an option or that which is permissible within the limits of the standard; and “can” is used to express possibility or capability.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.