



Alberta Transportation Dangerous Goods

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

Dangerous Goods Transport Tanks

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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)

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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).*

Bulk Transport Tanks

Federal Transportation of Dangerous Goods Regulations (TDGR) and the provincial Dangerous Goods Transportation and Handling Regulation cover the use of bulk tanks for transporting dangerous goods in Alberta.

Federal Legislation

Part 5.10 of the TDGR requires that anyone transporting Class 2 gases in a highway tank comply with the selection and use criteria set out in the Canadian Standards Association (CSA) Standard B622 (Selection and Use of Highway Tanks, TC Portable Tanks and Ton Containers for Transportation of Dangerous Goods, Class 2). Part 5.14 of the TDGR requires that anyone transporting Class 3, 4, 5, 6.1, 8 or 9 dangerous goods in highway tanks comply with the selection and use criteria set out in CSA Standard B621 (Selection and Use of Highway Tanks, TC Portable Tanks and Ton Containers for Transportation of Dangerous Goods, Classes 3, 4, 5, 6.1, 8, 9). These two standards help to identify the correct type of tank to use for different dangerous goods. Transport Canada has adopted rolling acceptance of these standards. That means that as new editions of the standards are published they are considered to be in force (with a 6-month transitional period, as identified in Section 1.3.2 of the TDGR).

Both CSA B621 and CSA B622 refer to the manufacturing standard CSA B620 (Highway Tanks and TC Portable Tanks for the Transportation of Dangerous Goods), which outlines how a tank must be constructed and maintained for continued dangerous goods service. All tanks constructed after January 12, 2018 must meet the requirements of CSA B620-14. All tanks constructed between January 15, 2015 and January 12, 2018 must be built to CSA B620-09. All tanks constructed prior to January 15, 2015 must be tested and inspected as per CSA B620-03.

Only facilities that are registered with Transport Canada can manufacture, assemble, modify, repair or test tanks that are used to transport dangerous goods. A list of registered facilities is available on the Transport Canada website at the link below.

<http://wwwapps.tc.gc.ca/saf-sec-sur/3/fdr-rici/highway/tanks.aspx>

US Tanks

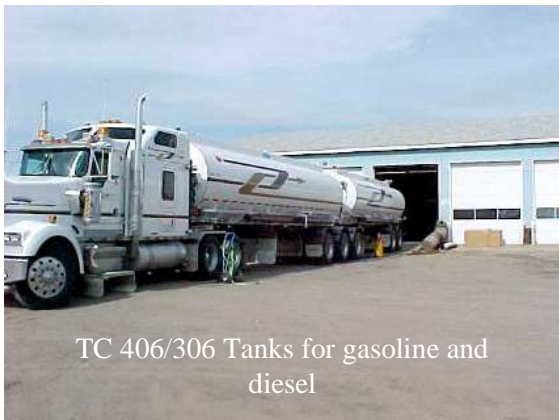
Tanks built in the US to the US Department of Transport standard described in the Code of Federal Regulations (CFR) Title 49 will have information on identification plates that is similar to their Canadian equivalent tanks. They will be marked MC or DOT instead of the TC mark used in Canada. MC or DOT tanks are considered equivalent to a tank designed to the Canadian standard and may be used for transport within Canada where allowed in CSA Standard B621 and B622.

Tank Types

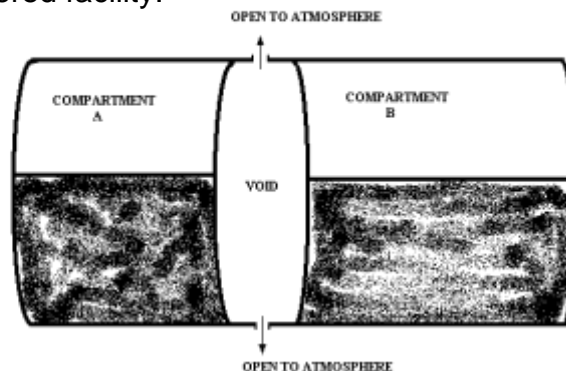
Tanks with **TC 406** designation are low pressure, oval highway tanks used for the transport of most flammable liquids including gasoline, crude oil and diesel. They operate at pressures between 18 kpa (2.65 psi) and 28 kpa (4psi). These tanks cannot be loaded by vacuum.

TC 406 tanks used in petroleum crude oil service may differ from units used for gasoline and other flammable liquids. There are alternate requirements for construction of TC 406 “Crude” tanks (such as alternate pressure relief devices). These units are marked “**TC 406 Crude**” and are to be used **solely** for the purposes of transporting products designated as UN1267 (PETROLEUM CRUDE OIL). These tanks may operate at a higher pressure than standard TC 406 tanks.

Safety features on these tanks include rollover protection to prevent damage to manholes and vents, high strength bumpers, safety relief vents and internal baffles to minimize liquid surge and provide added strength to the barrel of the tank.



Some TC406 tanks have more than one compartment. A “void” section often separates these compartments to prevent contamination between compartments. These voids must be open to atmosphere. There is a hole at the top and bottom of the void, which must not be plugged. The presence of a plug can indicate damage to the internal integrity of the tank. A tank found by enforcement staff with a plug will be placed out of service until the unit is repaired at a registered facility.



TC 407 tanks are circular tanks often used for transporting sour crude oil. These tanks are capable of operating at pressures higher than **TC 406** tanks, with Maximum Allowable Working Pressures (MAWP) starting at 172 kpa (25 psi) They are constructed to take all flammable liquids including the more volatile Packing Group I liquids, sour crude oil and some corrosives such as UN1780 - CORROSIVE LIQUIDS N.O.S (HYDROCHLORIC ACID). These tanks can be loaded by vacuum.



TC 407/307 Tanker for sour crude and extremely flammable liquids

TC 412 tanks are circular tanks used most commonly to transport corrosive liquids. These tanks operate at pressures similar to **TC 406** and **407** tanks. Some are steel with large outer stiffening rings and are often lined. The type of lining may prevent the construction of internal baffles in these units and hence they are usually long and narrow to minimize surging. Some tanks constructed to this standard are manufactured from fibreglass reinforced plastic. This type of tank is often used in dual service because it can handle both corrosive liquids and, with suitable grounding capabilities, flammable liquids such as crude oil. TC 412 tanks loaded by vacuum must have a MAWP of at least 172 kpa.



TC 412/312 Lined Steel Tanker for acids and caustic material



TC 412/312 Fibre Glass Tanks for acids and crude oil

TC 331 tanks are high pressure tank designed for liquefied gases such as propane, chlorine and anhydrous ammonia. The MAWP for **TC 331** tanks must be at least 690 kpa (100psi) and can exceed 3450 kpa (500 psi). Additional features on these tanks may include off tank shutdown systems in the event of a failure during loading or offloading.



TC 338 are insulated highway tanks used for transporting cryogenic gas. These are used for cold liquefied gases such as Nitrogen. A variation on this design is the **TC 341** tank, generally used for transporting non-flammable refrigerated liquefied gases (like oxygen). Both these types of tanks are designed in a similar manner to a Thermos bottle. They are engineered to keep the cold in and the heat out of the product by having a tank within a tank with a vacuum in-between to lessen heat transfer. They are not designed for high pressure service and operate at pressures of less than 1034.2 kPa (150psi). These units often periodically vent gases to maintain the pressure in the tank, especially on hot days.



TC 407/412/350 tanks are vacuum trucks commonly designed with a characteristic large rear door which opens for dumping. They are generally used for cleanup of chemical or oil spills, clean out of storage tanks or hauling crude oil and water from the oil separation process at well heads. A unit dedicated to hauling crude oil may be designated as a “**TC 350 Crude**” tank and the certification plate on the tank would be marked accordingly. A full specification **TC 350** tank must have a thermal and remote shutoff installed on all product outlet points, including mud gates, unless it is marked as a **TC 350 Crude**. As with **TC 406 Crude** tanks, only crude oil or water/oil mixtures from an oil well would be allowed in one of these units.



TC 350/407/412 Vacuum Tanker for wastes including oilfield wastes

TC 3AXM/3AAXM/3T tube trailers are specialized units that are designed to the CSA B339 Standard (Cylinders, Spheres, and Tubes for the transportation of Dangerous Goods) used for cylinders. They hold gases, which cannot be easily liquefied, such as natural gas, at very high pressure. These units are usually re-tested using acoustic methods under permits issued by Transport Canada. U.S. DOT units are allowed if they have passed inspection and testing in CSA B339.



DOT 3AXM Tube Trailer for hydrogen or natural gas

Identification Plates

All tanks used in the service of transporting dangerous goods must have a plate attached to the shell or an integral part of the structure of the tank. The plate must be constructed of a metal that is not subject to corrosion and it must be located on the left side of the tank near the front and contain the following information:

- Transport Canada specification e.g. TC 406 or TC 406 Crude;
- tank vehicle assembler (Tank veh. assembler);
- tank vehicle serial number;
- tank vehicle completion and certification date – month and year (cert. date);
- tank manufacturer (Tank mfr.);
- tank maximum allowable pressure in kPa (MAWP);
- tank test pressure in kPa (Test P);
- vessel material specification number;
- weld material (Weld Matl.);
- minimum allowable thickness of shell – in millimeters (Min. shell thick);
- minimum allowable thickness of heads – in millimeters (Min. head thick);
- volumetric capacity – in litres (Vol. Cap. Litres);
- date of tank manufacture – month and year (Date of mfr.).
- manufacturer
- vehicle identification number
- tank design temperature range – in Celsius
- maximum design density of lading – in kilograms per litre
- exposed surface area – in square metres
- maximum product load - in kilograms
- heating system design pressure – in kpa
- original test date (month and year)
- heating system design temperature – in Celsius

*Note: Additional information may be required depending on the type of tank and when the tank was constructed. Please refer to the version of the CSA B620 Standard at the time of construction of the tank when determining what information is needed on the tank plate.

Tank Testing and Marking

All tanks must be tested on a periodic basis as shown in the following table (Table 7.1 in CSA B620):

Type	External Inspection	Internal Inspection	Lining Inspection	Leakage Test	Pressure, Hydro or Pneumatic	Structural Inspection
406/306	1 year	5 years		1 year	5 years	
406/306 Crude	2.5 years	5 years		2.5 years	5 years	
407/307	1 year	5 years		1 year	5 years	
412/312	1 year	5 years		1 year	5 years	
423	1 year	1 year		1 year	5 years	5 years
350	6 months	1 year		1 year	2 years	
350 Crude	1 year	1 year		1 year	2 years	
331	1 year	5 years		1 year (2 years for Chlorine)	5 years (2 years for Chlorine) – not required for sodium metal service	
338	1 year				5 years	
341	1 year	10 years (unless alternative testing is used)			10 years	
11	1 year	10 years if it has a manhole		1 year	5 years	
TC 44 Portable	1 year	5 years		1 year	5 years	
51 Portable	2.5 years	5 years	5 years		5 years	
56/57 Portable	2.5 years				2.5 years	
60 Portable	2 years	4-8-10-12 years then every year	4-8-10-12 years then every year		4-8-10-12 years then every year	
Types 1,2 and 3 Intermodal	2.5 years	2.5 years	5 years		5 years	
UN 31 Intermediate Bulk Container (Slip Tanks)	5 years			5 years		

Lined and unlined tanks in corrosive service must have an annual internal inspection. The lined tanks must also have the lining checked at the same time interval. Unlined tanks in corrosive service must have an annual internal inspection and a thickness test done every 2 years.

All tanks with an upper coupler must have the tank checked for corrosion under the upper coupler every 5 years.

For additional requirements, refer to Table 7.1, Table 7.2, Table 7.3 and related legend from CSA B620.

Each tank must be marked on the side near the metal identification plate or head end with the following letters, as applicable, to show that the periodic tests have been carried out. A new tank requires the initial test information on the manufacturer's plate only:

Letter	Test or Inspection
V	Visual (External) Inspection
I	Internal Inspection
P	Pressure Test
T	Thickness Test
L	Lining Inspection
K	Leakage Test
UC	Upper Coupler Area Inspection
WF	Wet Fluorescent Magnetic Particle Inspection
C	For TC 341 tanks only if a Cold Vacuum Retention test has been carried out instead of an internal (alternative testing).
S	Structural Inspection

The date the tests were carried out must also appear on the tank, in the following format: Date, Test Type, Last 4 digits of the facility registration number. For example:

02/09 V I K P 1234

shows that visual, internal, leak and pressure tests were carried out in February 2009. The digits "1234" represent the last four digits in the Transport Canada registration number of the test facility.