TDG-001 Chapter 6 Notes

Tank Standards

The transportation of dangerous goods by tank is governed by stringent standards and regulations to ensure the safe handling and containment of hazardous materials. These standards cover various aspects of tank design, construction, testing, inspection, and certification to minimize the risk of leaks, spills, and accidents during transportation.

Transport Canada's Transportation of Dangerous Goods (TDG) Regulations outline specific requirements for tanks used in the transportation of dangerous goods by road, rail, and marine vessels. These regulations cover various aspects of tank design, construction, testing, inspection, and certification to ensure the safe handling and containment of hazardous materials. Here are some key provisions from the TDG Regulations regarding tank standards:

1. **Design and Construction**: Tanks used for transporting dangerous goods must be designed and constructed to meet specified standards for materials, structural integrity, pressure ratings, and compatibility with the hazardous materials being transported.
2. **Closure Mechanisms**: Tanks must be equipped with secure closure mechanisms to prevent leaks or spills during transportation. Closure mechanisms must be designed to withstand the rigors of transportation and provide a reliable seal under normal operating conditions.
3. **Pressure Relief Devices**: Tanks containing pressurized gases or liquids must be equipped with pressure relief devices to prevent over-pressurization and ensure the safe release of pressure in case of emergencies. Pressure relief devices must be designed and installed according to specified standards to prevent leakage or rupture.
4. **Venting Systems**: Tanks must be equipped with venting systems to allow for the safe release of vapors, gases, or pressure buildup during transportation. Venting systems must be designed and installed to prevent over-pressurization, minimize emissions, and comply with applicable environmental regulations.
5. **Testing and Certification**: Tanks must undergo rigorous testing and certification procedures to ensure compliance with regulatory requirements and industry standards. Testing may include hydrostatic testing, pressure testing, leak testing, and structural integrity testing to verify the tank's performance under various conditions.

6. **Markings and Labels**: Tanks must be marked with the appropriate labels, placards, and markings to identify the hazardous materials being transported and communicate their associated risks. Markings must be clear, durable, and prominently displayed on the tank to ensure visibility and readability during transportation.
7. **Inspection and Maintenance**: Tanks must be regularly inspected and maintained to ensure their continued safety and compliance with regulatory requirements. Inspections may include visual inspections, leak tests, pressure tests, and internal examinations to identify any defects or damage that could compromise the tank's integrity.
8. **Training and Documentation**: Personnel involved in the handling, operation, and maintenance of tanks used for transporting dangerous goods must receive adequate training and instruction on safety procedures, emergency response protocols, and regulatory compliance. Documentation of tank inspections, maintenance records, and training activities must be kept on file and made available for inspection upon request.

Storage tanks used for holding hazardous materials are subject to stringent standards and regulations to ensure their safety, integrity, and compatibility with the substances they contain. Here are some key specifications and standards for storage tanks:

Materials

- Tanks must be constructed of materials that are compatible with the hazardous materials they are intended to store.
- Common materials used for tank construction include carbon steel, stainless steel, fiberglass-reinforced plastic (FRP), polyethylene, and concrete.
- The selection of materials depends on factors such as the chemical properties of the stored substance, temperature, pressure, and environmental conditions.

Structural Integrity

- Tanks must be designed and constructed to withstand the loads and stresses associated with their intended use.
- Structural integrity standards ensure that tanks are resistant to deformation, leakage, corrosion, and other forms of damage.
- Tanks must be built according to recognized engineering practices and standards to ensure their structural stability and longevity.

Pressure Ratings

- Tanks used for storing pressurized liquids or gases must be designed and rated to withstand the internal pressure generated by the stored substances.

- Pressure ratings are determined based on factors such as the maximum allowable working pressure (MAWP), design pressure, and safety factors.
- Tanks must comply with applicable pressure vessel codes and standards, such as those outlined in the ASME Boiler and Pressure Vessel Code.

Compatibility with Hazardous Materials

- Tanks must be compatible with the specific hazardous materials they are intended to store to prevent chemical reactions, contamination, or degradation.
- Compatibility considerations include factors such as chemical composition, concentration, temperature, pressure, and potential interactions with tank materials.
- Tank materials and coatings must be selected based on compatibility testing, chemical resistance data, and manufacturer specifications.

Regulatory Compliance

- Storage tanks must comply with applicable federal, provincial, and municipal regulations governing the storage of hazardous materials.
- Regulatory requirements may include permits, licenses, inspections, and compliance with environmental, health, and safety standards.
- Tanks must be installed, operated, and maintained in accordance with regulatory requirements to ensure their safe and legal operation.

Industry Standards

- Tanks should be designed, constructed, and installed in accordance with industry standards and guidelines developed by organizations such as the American Petroleum Institute (API), Canadian Standards Association (CSA), and Underwriters Laboratories (UL).
- Industry standards provide recommended practices, specifications, and guidelines for tank design, fabrication, inspection, and maintenance.

Small Containers

The definition of small containers are ones with a capacity of **up to** 450 litres. When transporting dangerous goods in small quantities in Canada, it's essential to use containers that meet regulatory requirements for safety and compliance. Here are some acceptable small containers commonly used for transporting dangerous goods:

UN-approved Drums and Barrels

Small steel or plastic drums and barrels that are UN-approved can be used for transporting small quantities of hazardous materials. These containers are designed to withstand the rigors of transportation and provide proper containment for the substances being shipped.

Jerrycans

Jerrycans made of plastic or metal are commonly used for transporting small quantities of liquids, including hazardous materials such as flammable liquids or corrosive substances. Ensure that jerrycans are UN-approved and suitable for the specific hazardous material being transported.

Small Glass or Plastic Bottles

For transporting small quantities of hazardous liquids or solids, small glass or plastic bottles with secure closures can be used. These bottles should be UN-approved and labeled with the appropriate hazard information according to the Transportation of Dangerous Goods (TDG) Regulations.

Fiberboard Boxes

Fiberboard boxes with inner packaging, such as plastic bags or containers, can be used for transporting small quantities of solids or granular materials. Ensure that fiberboard boxes are properly labeled and marked with the required hazard information.

Composite Containers

Composite containers made of a combination of materials, such as plastic and metal, can be suitable for transporting small quantities of hazardous materials. These containers should meet UN standards for packaging and labeling of dangerous goods.

Intermediate Bulk Containers (IBCs)

While larger than traditional small containers, IBCs with smaller capacities (e.g., 1000 liters or less) can be used for transporting small bulk quantities of hazardous liquids or solids. Ensure that IBCs are UN-approved and suitable for the specific hazardous material being transported.

Flexitanks

Flexitanks are flexible, collapsible containers designed for transporting liquids in standard shipping containers. While typically used for larger quantities, smaller flexitanks may be

suitable for transporting small quantities of certain hazardous liquids, such as chemicals or food-grade products.

When selecting small containers for transporting dangerous goods in Canada, ensure that they meet the requirements of the TDG Regulations, including proper packaging, labeling, marking, and documentation.

Large Containers

Large containers have a capacity of **more** than 450 litres. When transporting dangerous goods in large quantities in Canada, it's crucial to use containers that meet rigorous safety standards and regulatory requirements. Here are some acceptable large containers commonly used for transporting dangerous goods:

Tank Trucks

Tank trucks, also known as tanker trucks or tankers, are specialized vehicles equipped with tanks for transporting liquids or gases in bulk. They are commonly used for transporting hazardous materials such as petroleum products, chemicals, and liquefied gases. Tank trucks must meet regulatory requirements for tank design, construction, labeling, and safety equipment.

Rail Tank Cars

Rail tank cars are large cylindrical containers mounted on railway rolling stock for transporting liquids or gases in bulk. They are used for transporting a wide range of hazardous materials, including flammable liquids, corrosive substances, and toxic gases. Rail tank cars must comply with strict safety standards and are subject to regular inspections and maintenance.

Tank Containers

Tank containers, also known as ISO tanks, are standardized containers designed for intermodal transportation by road, rail, or sea. ISO tank containers are built to international standards and can be easily transferred between different modes of transport. They are commonly used for transporting hazardous chemicals, food-grade liquids, and other bulk liquids.

Intermediate Bulk Containers (IBCs)

IBCs are large containers typically made of plastic, metal, or a combination of both. They are used for transporting and storing bulk quantities of liquids or solids, including hazardous materials. IBCs come in various sizes and designs, with features such as integrated pallets, stackability, and UN certification for hazardous materials transport.

Flexitanks

Flexitanks are large, collapsible containers designed for transporting non-hazardous and hazardous liquids in standard shipping containers. They are made of flexible, multi-layered materials that are compatible with a wide range of liquid cargoes. Flexitanks provide a cost-effective alternative to traditional tank containers for certain types of bulk liquid shipments.

When selecting large containers for transporting dangerous goods in Canada, it's essential to ensure that they meet the requirements of the Transportation of Dangerous Goods (TDG) Regulations, as well as any other applicable regulations and standards. Proper training and handling procedures are also crucial to ensure the safe and compliant transportation of dangerous goods.

Certification Safety Marks

For equipment or packaging used for the transportation of dangerous goods, you may encounter the "Transport Canada" (TC) certification mark. This mark indicates that the equipment or packaging has been certified by Transport Canada as meeting specific safety standards and regulatory requirements for the transportation of dangerous goods.

The TC certification mark assures users that the equipment or packaging has undergone testing and evaluation to ensure its compliance with applicable regulations, including the Transportation of Dangerous Goods (TDG) Regulations. This certification is important for ensuring the safe handling, storage, and transportation of hazardous materials.

When selecting equipment or packaging for the transportation of dangerous goods in Canada, it's essential to look for the TC certification mark to ensure compliance with regulatory requirements and to promote safety throughout the transportation process.

Remember:

- it is the shipper’s responsibility to choose the right container for dangerous goods.
- Some products can be only be transported in containers built to national or international standards.

- Coded certification marks are to be used to show which standard applies.
- Certification marks on compressed gas cylinders often begin with TC which stands for Transport Canada.
- Never use worn or damaged containers.
- Some containers can be reused if in excellent shape but some containers will have to be reconditioned before they're refilled.
- Dangerous goods should never be in the same container with other materials that could cause them to leak or spill, or if there's a chance they may mix and react to each other to cause a hazard.