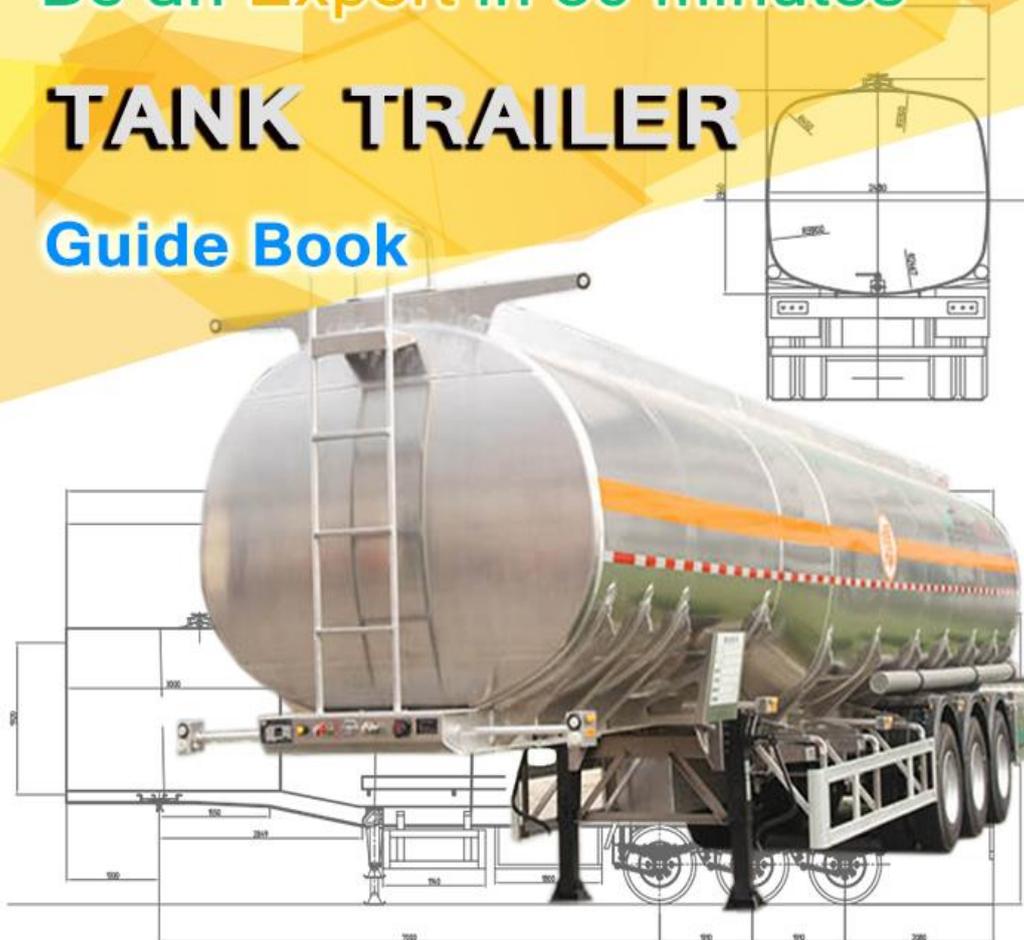


Be an Expert in 30 minutes

# TANK TRAILER

Guide Book



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Have you seen tank trailers on the road and wondered how their components function? Are you planning to buy a tank trailer for your business but need help in choosing the right model?

Are you an engineer who needs to increase his or her know on the structure of tank trailers. In this book, you will learn everything you need to know about tank trailers.

We will introduce to the [heavy load tank trailer](#), which is also called a tank truck trailer or semi tank trailer. The guide does not focus on the small or home tank trailer. We will cover the small trailers in another guidebook.

Tank truck trailers are used to transport liquids and gas in large volumes. The trailers come in different models because of the wide variety of liquefied loads.

The internal structure also varies depending on the type of liquid or gas that the trailers are designed to transport. The tanks may be pressure or non-pressurized and insulated or non-insulated.



Petroleum tank trailers

Tank trailers designed to carry one load has a single compartment while those that carry multiple loads have internal divisions in their tanks.

The distinguishing factors of tank trailers include the shape of the tank, the type of load that a trailer carries, and the size. Other distinguishing factors include refrigeration capability, pressurization capability, and acid resistance.

Some models are specifically designed to comply with a country's regulations on the transportation of liquefied loads. Hence, the structure of trailers will vary across countries. However, the functionality of the trailers is the same regardless of the manufacturer.

Some the aspects of tank truck trailer that you can expect to learn from this guidebook include:

- **Different kinds of tank trailers: This book covers six types of common tank trailers including a fuel or oil tank trailer, powder tank trailer and insulated tank trailer with a heating device or system. Other types covered in the book include a CNG tank trailer, LNG tank trailer, and LPG tank trailer.**
- **The materials used to make tank trailers**
- **How to inspect different components of tank trailers**
- **The manufacturing process of the tanks**
- **How to buy a tank trailer**
- **What you should pay attention and how to stay safe when driving a tank trailer**
- **How to maintain a tank trailer and the components you should pay attention to during maintenance**

**You will learn different applications of tank trailers, their components, and the manufacturing process. So, You will know how to choose the right model for your business.**

#### How To Make A Chemical Tank Trailers

We will start with a detailed description of the different types of tank trailers and then proceed to show you how to inspect, buy, and maintain a tank trailer.

## Chapter 1: Fuel/Oil Tank Trailer

Have you ever seen an [heavy load tank trailer](#) on the road? Can you differentiate it from other tank trailers? If not, this section describes the oil tank trailer in detail.

You will learn the full structure of the trailer and the materials used to make different parts. You will also learn about the internal compartments and the purpose of having several compartments in one tank trailer.

The section covers different components of the fuel tank trailer and compares the two processes of loading, that is, top loading and bottom loading.

The advantages and disadvantages of both methods are outline. First, we look at the definition and description of the oil tank trailer including its major applications.

## 1.1 What is Fuel Tank Trailer?

---

One of the common types of tank trailer you will find on the road is the fuel tank trailer. The trailer is used to transport gasoline, diesel oil, and benzene. It is also used to transport some types of inflammable and plosive liquid.

Gasoline and diesel fuels are used for standard cars and other types of vehicles. Hence, most fuel trailers have more than one compartment. Why do fuel tank trailers have several compartments? Here are the major reasons:



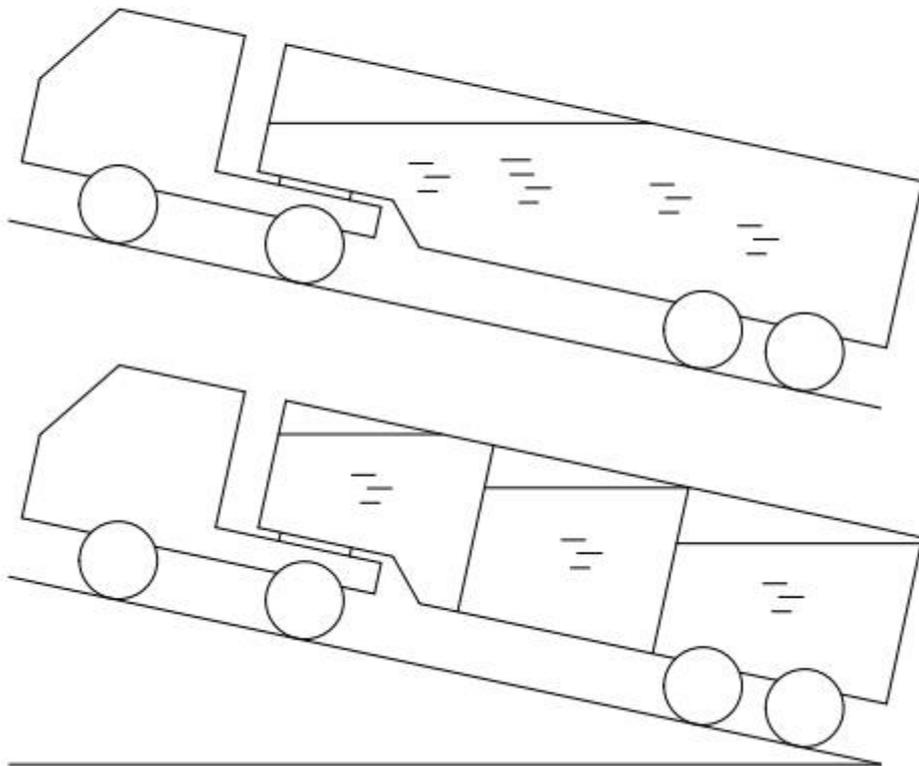
Fuel Tank Trailer

**The efficiency principle:** A trailer with different compartment can transport different kinds of liquid at the same time. This reduces the transportation cost and saves fuel because the trips are reduced to one.

Transporting each liquid in a different tanker is more expensive and inefficient. Trailers with multiple compartments can transport different grades of gasoline in one trip. A service station can receive all the products needed in just one trip.

**To ensure stability:** A liquid fluctuates to all directions in the tank when the trailer is running on a slope. If the fuel tank trailer has a large capacity, the fluctuations will cause major changes in the center of mass.

This, in turn, will cause major changes of the axle load, which affect the stability of the truck and trailer. The instability may cause the trailer to jackknife or rollover. Using a multi-compartment model reduces the changes of the axle load and hence keeps the trailer stable.



how multi-compartments work

## 1.2 Material





carbon steel tank trailer



Stainless Steel Tank Trailer

### Aluminum alloy

The advantages of using aluminum alloy on tank trailers include:

- It is lighter in weight than steel
- Aluminum tank trailer can carry more liquid load

- The trailers are safer and more secure
- The material is resistant to rust and hence it does not pollute the liquid during transportation

Some of the disadvantages of aluminum allow include:

- The strength of aluminum is almost half the strength of steel
- It is highly prone to stress cracking
- Welding aluminum plates is cumbersome
- It is more expensive than steel



Aluminium Alloy Tank Trailer

The type of material used on a fuel tank trailer determines its price and loading capacity. The aluminum trailer may be light and resistant to rust but their strength is low and their price is high.

You must consider the end use of the trailer and your budget when choosing between the two materials. Steel may be your best choice if you need a high-capacity fuel tank trailer at a low cost.

The fact that aluminum is lighter and lower in strength than steel does not mean that aluminum trailers are weak. The trailers have enough loading capacity to transport fuel or oil in bulk.

## 1.3 Components

---

### 1.3.1 Tank body, heads, and cylinder

Tank trailers have different shapes include circle, ellipse, and rectangular shapes. Their height of gravity ratio is 1:0.79:0.65. Large fuel tankers have an ellipse and round rectangular shape because of the need for stability.

The low center of gravity in this shape keeps the trailer stable. High pressure tanks, on the other hand, are built in the circle shape.



ellipse tank trailer

The body of a tank trailer consists of the heads and cylinder. The cylinder is manufactured by coiling and welding steel plates. The heads are integrated (unibody) through the spinning stamping process.



tank heads

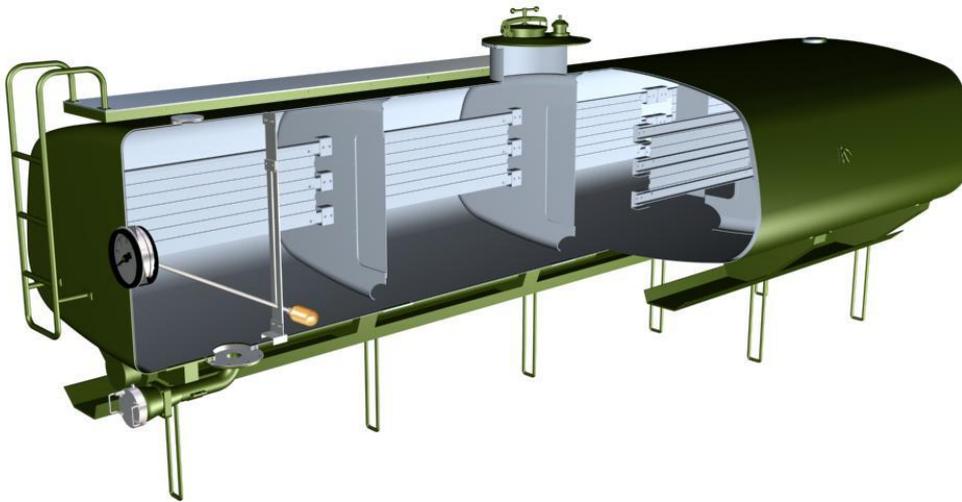
The process involves continuous partial stamping at a specific temperature. For the cylinder and heads to be accurate after welding, their roundness tolerance should be less than 3mm.

### **Oil Baffle Plate**

To reduce the fluctuations of the liquid in the tank, all the rooms in the tank have baffle plates. A longitudinal baffle plate is placed along the axis in the tank to reduce transverse fluctuations of the liquid in the tank.

A transverse baffle plate is placed along the cross section to alleviate the axial fluctuation of the liquid in the tank.

Transverse baffle plates have a manhole on each plate, which generally is not less than 550mm in diameter. The dimensions are necessary for the ease of maintenance of the plates.

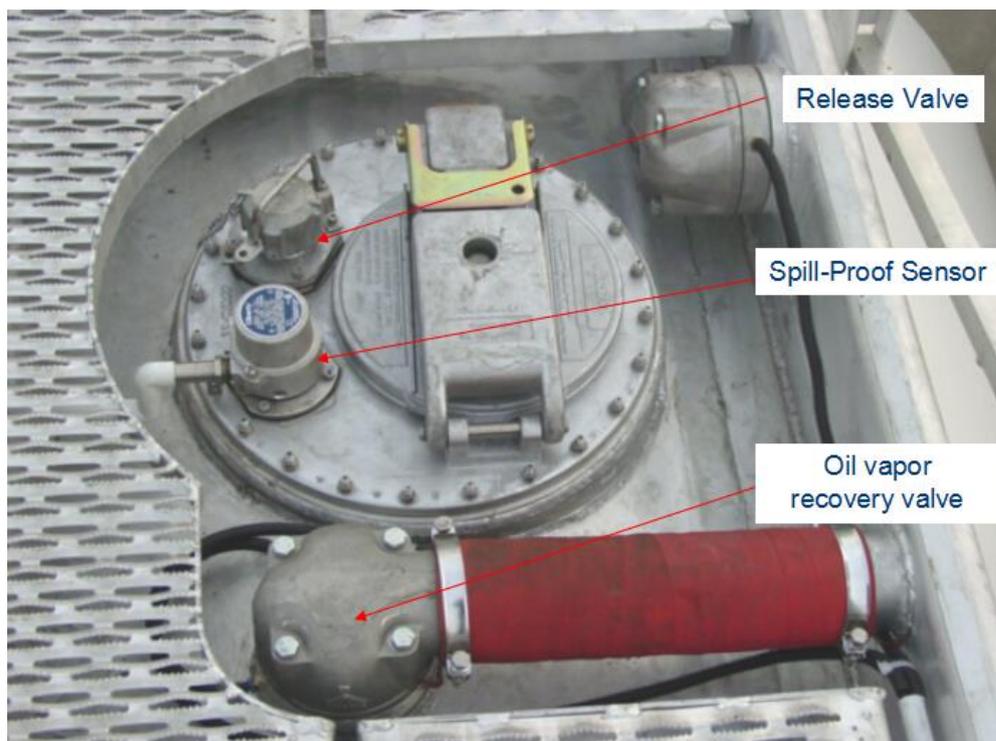


oil baffle plate

To improve the effect of the transverse baffle plate, two or more manholes are places of the baffle plates. The manholes should be staggered in the same compartment.

### 1.3.2 Manhole Cover, Breather Valve, and Spill-proof sensor

The manhole cover is simply the cover on the trailer's manhole as illustrated in the picture below. The cover has important components that you should know about, which keep the tank safe.



manhole cover

### **Air release valve**

One of the important components of the manhole cover is the respiration valve, which is also known as a relief valve. The function of the valve is to adjust the pressure inside tank automatically.

This helps to keep the pressure within a certain range. The relief valve protects the tank and reduces the volatilization loss of volatile oil.

The body of the respiratory valve is made of stainless steel with nickel cadmium. All other parts are made of stainless acid-resistant steel to prevent rust.

A small and medium tank has one breather valve for all the compartments. A large tank, on the other hand, has breathing valves for each compartment.

### **Spill-Proof Sensor**

The spill-proof sensor is the alarm installed on the manhole cover. The sensor produces a sound or noise whenever the height of the liquid inside the tank changes quickly.

When the liquid reaches the right height, the whistle or alarm stops. The sensor in this case plays the role of a filling up alarm. In addition, the whistle stops with the liquid insider the tank discharge empty.

### **Oil vapor recovery valve**

The oil gas from volatile can be recovered to the oil tank, which prevents leakage of the oil gas. Other oil gas recovery devices are used to condense and reuse the oil gas.

## **1.3.3. Oil Line System**

The system consists of several valves that include the bottom valve, oil vapor recovery valve, and the fuel outlet valve. Let us look at the functions of each of these valves.

### **Bottom valve**

The bottom valve is generally installed in an oil tanker's outlet. In case of a crash in an accident, the valve can cut off the pipeline in 5 seconds. This ensures the safety of the cargo and people in the car.

The quick cut off also prevents leakage and explosion in an accident. The quick cut off is enough to save lives and prevent loss of the the liquid being transported.

Tank trailer drivers are always advice to inspect and this other valve before loading the trailer for their own safety.



bottom valve

### Fuel outlet valve

This valve is used for quick unloading of the liquid in the tank. Its internal structure complies with fluid mechanics and can minimize internal pressure during a large flow.

The special structure used in the fuel outlet valve help in ensuring that there is no oil leakage when the joint is removed.



fuel outlet valve

## 1.4 Top or bottom loading

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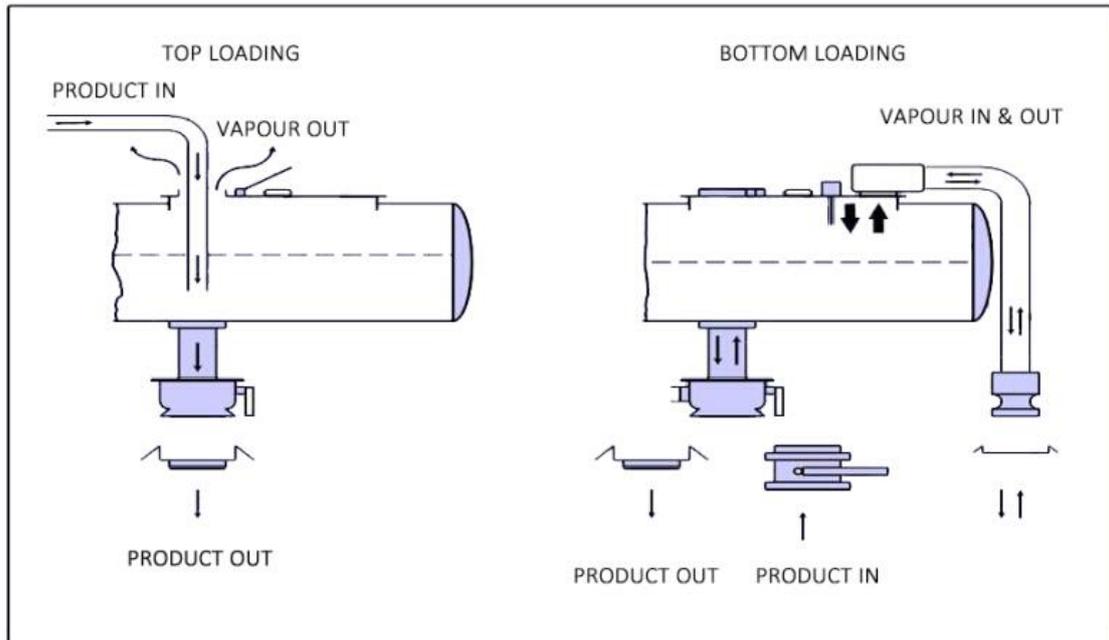
Loading fuel or liquid in the tank truck trailers is done in two ways. The fuel or liquid can be loaded from the top or from the bottom. Each method has its pros and cons.

**Top loading:** Loading fuels or liquid is unsafe and risky. Gasoline evaporates into the atmosphere when loaded from the top. The vapor or fumes increase the risk of an explosion at the filling station.

In addition, the evaporated gas is a loss of the total volume of the cargo. Top loading is also harmful to the workers and hence it should be avoided at all costs. In addition, top loading is time consuming.

**Bottom loading:** The method is recommended for all types of fuel and liquid cargo. It is safe and efficient because the loading speed is fast. Gasoline gas remains within the internal circulation.

Bottom loading has no explosion risk and hence it is considered safe for the workers.



tanker loading

[Read More:](#)

[Fuel tank Wiki](#)

[How to make Stainless Steel Tank Trailers](#)

Composite wall structure, tank trailer formed therefrom and method of manufacturing same

## Chapter 2: Bulk Powder Tank Trailer

Another common type of truck tank trailer is the bulk powder tank trailer. This section has everything you need to know about this tank trailer. The main lessons in this chapter include

- A description of the bulk powder tank trailer
- The applications of the tank trailer

- Different structures of the bulk powder tank trailer
- Different structures of the fluid bed

## 2.1 What is a bulk powder tank trailer?

---

You can tell from the name that the tank trailer is used to transport powder cargo. However, the trailer carries powder cargo in bulk.

The main applications of tank trailer include transporting cement, flour, lime powder, mineral powder, fly ash, chemical powders, and stone powder.

This type of trailer is widely used on large construction sites and cement factories and warehouses. The tank trailer uses compressed air to discharge powder from the tank.

## 2.2 Different Structures of a Bulk Powder Tank Trailer

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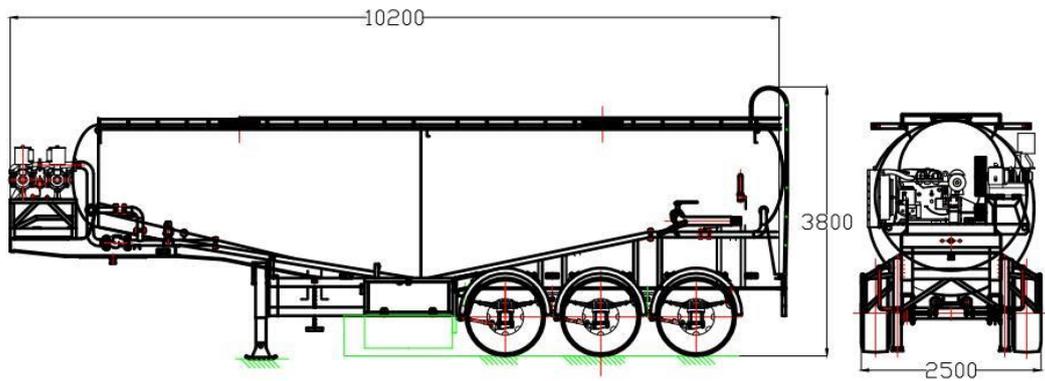
[Bulk powder tank trailers](#) come in three different structures that include the horizontal, funnel, and lifting structures. Each structure is ideal for a specific type and weight of powder cargo.

Let us now look at the advantages and disadvantages of the three types of structure.

- **The Horizontal Type**



Horizontal Type Powder Tanker



cement trailer drawing

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**Advantages:** With this structure, the center of gravity of the tank is low, which enables its stability. The horizontal tank has a larger volume than other types of tanks. Most horizontal tanks have one compartment.

Hence, the time required to build gas pressure to the required level is short. The process of discharging the gas is also faster. Another advantage of a horizontal tank is that it is easier to operate.

**Disadvantages:** The horizontal tank can only adopt a pneumatic discharge. The discharge process is inefficient because it does not discharge all the powder in the tank. Part of it is left in the tank.

For this reason, the range of materials that can be transported using a horizontal is limited. The applications of this tank are limited to powder materials such as cement and fly ash.

- **Funnel Type**



pneumatic dry bulk trailer

**Advantages:** The design of this tank trailers allows it to transport a wider range of materials than a horizontal tank. The shipment can be either powder and granule material or the massive materials.

The pneumatic discharge can be used for powder and granule materials. The massive materials, on the other hand, are discharged into the designated pit by way of tipping gravity.

The angle between the cone bus bar and the horizontal plane is greater than or equal to  $45^\circ$ . Hence, this guarantees that the powder will slide to the bottom of the fluidized bed smooth.

The fluidized bed area in this type of tank trailer is not large. Consequently, the residual rate is very low.

The tank design and material reduce the left over material after discharge. The material also reduced the deterioration and pollution associated with powder shipment.

The funnel type of powder tank trailer is a good choice to transport food materials such as flour and powder chemical material.

- **Lifting Type**



lifting powder tank trailer

**Advantages:** The lifting type has more advantages than the horizontal and funnel structures. The lifting type of a powder tank trailer can be described as a single storehouse structure.

When the tank is lifted, it has a large angle of tilt. Hence, the unloading operation is simple. The discharge speed of the lifting type is faster than the speed of the both horizontal and funnel types of tank.

Another advantage of the lifting tank type is that it can transport a wide range of materials. Examples of materials that this tank type carries include powder, granule material, and block material.

The lifting type can use both pneumatic discharge and gravity tipping. The fluidized bed is very small and this means that the residual materials are extremely little. The residuals are almost negligible.

An additional advantage of the lifting tank time is that the internal structure is simple. Hence, cleaning and disassembling the fluidized bed is fast and convenient.

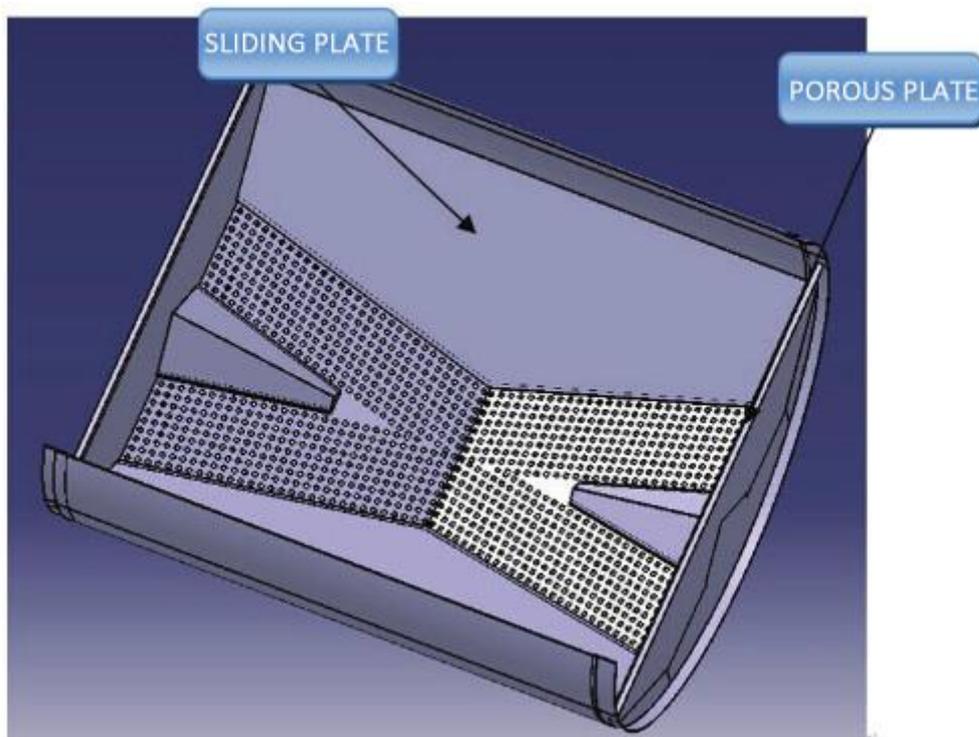
You can change from one type of load to another when using this type of tank. Hence, it can be used for multi-purposes.

## 2.3 Different Structures of the Fluid Bed

---

One of the major components of the bulk powder tank trailer is the fluid bed. The bed comes in different structures that include the X type, funnel type, and the pipe type. Each of these structures is described with illustrations below.

- **X Type**



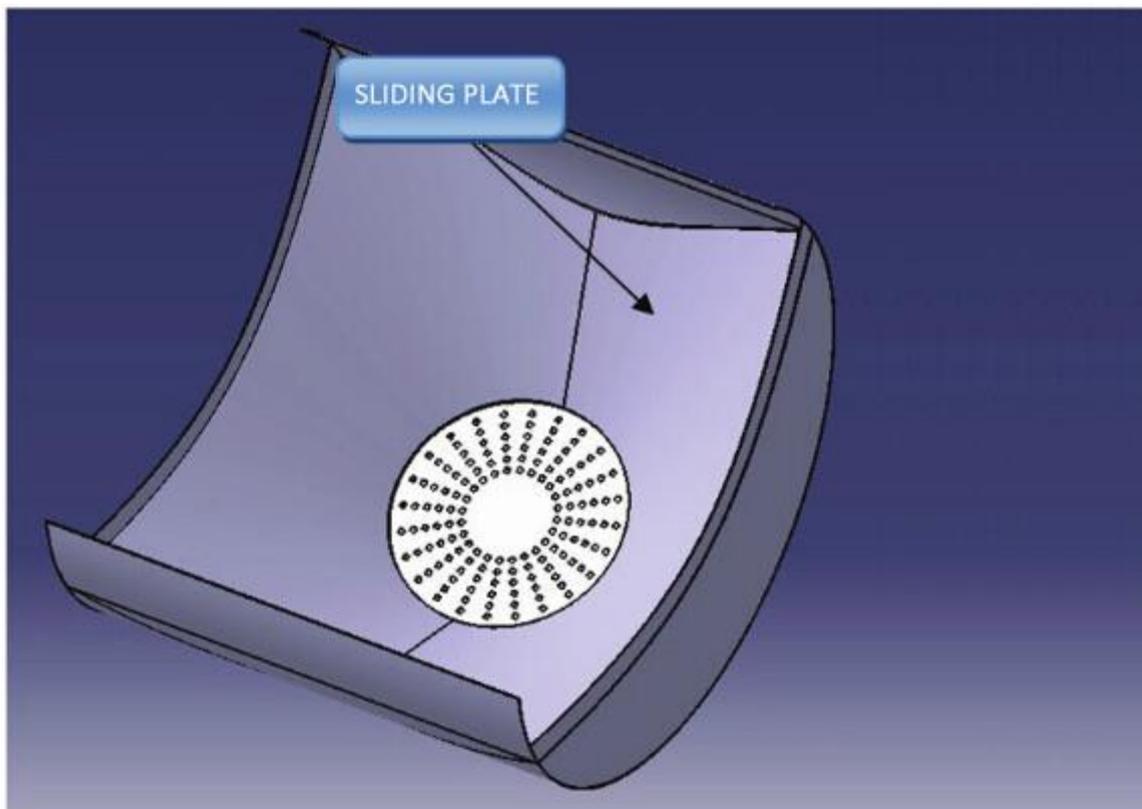
x type fluidized bed

The angle between the sliding plate and the horizontal plane is  $42^\circ$  to  $45^\circ$ . The fluidized bed has an X shaped at the bottom and hence the name of this type of structure.

The X type of the fluidized bed is longer and its discharging effectiveness is low. Hence, a large amount of residual materials remains after the discharge process.

Another disadvantage of the X type is that its operation is complex. The fluidized bed has a larger porous plate than other types, which makes its operation complicated.

- **Funnel Type**



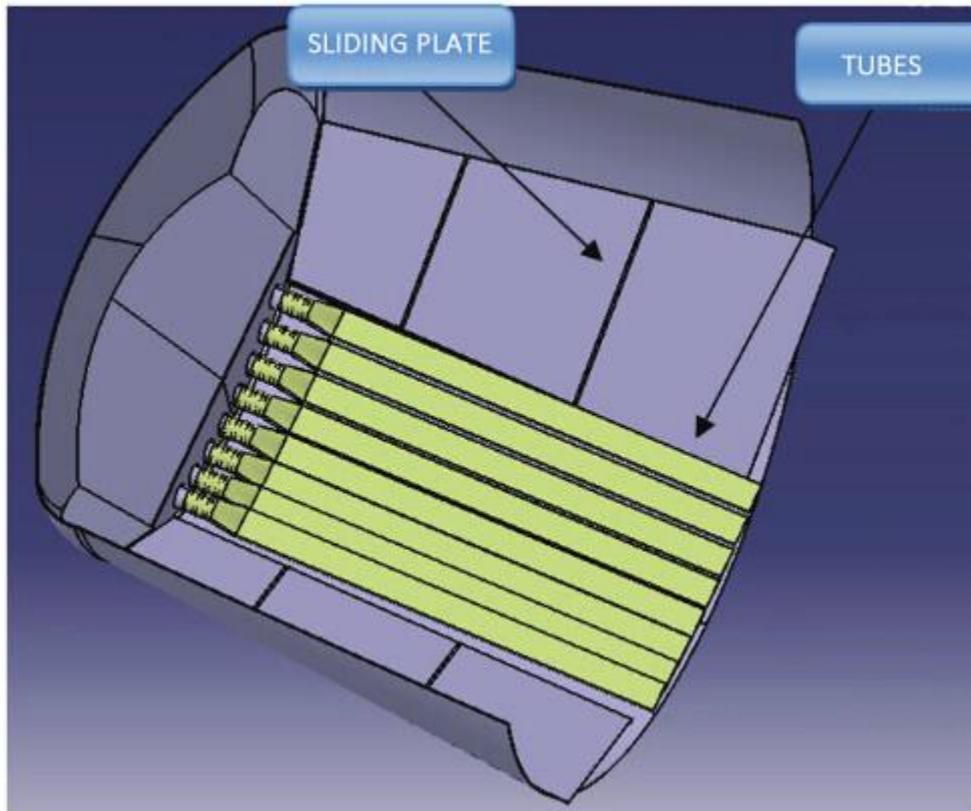
funnel fluidized bed

In this type of a fluidized bed, the internal sliding plate has a funnel shape, which explains its name. The angle between the sliding plate and the horizontal plane is  $45^\circ$ .

The fluidized bed at the bottom consists of a porous plate and a breathable fabric. The funnel fluidized bed is short and hence the tank has many compartments. Hence, it can transport different types of powder materials at the same time.

**Disadvantages:** The unloading speed of the funnel fluidized bed is slow. The speed is slower for materials with a large rest angle. The many compartments in this type of fluidized bed make its production process complex. In addition, the production efficiency is low.

- **Pipe Type**



tubes fluidized bed

The pipe or tube type of a fluidized bed is joint to the bottom of the tank directly. Similar to the X type, the angle between the horizontal plane and the sliding plate is between  $42^\circ$  and  $45^\circ$ . The length of the fluidized bed can be up to 6 meters.

Hence, the compartments are fewer. Manufacturing this type of fluidized bed is easy and convenient. It has a simple structure and the unloading operation is convenient. Another advantage is that it is cost-effective and easy to maintain.

The main shortcoming of the pipe type of the fluidized bed is that the flow distance is long. Hence, trailers with this structure can only transport materials whose rest angle is small.

The materials should flow smoothly out of the tank. Examples of such materials include cement and fly ash.

**Read More:**

[Tank trailer for transporting dry and liquid flowable materials](#)

# Chapter 3: Insulated Tank Trailer with Heating Device

There are different types of insulated tank trailers. This section focuses on the insulated tank trailers that come with a heating system. Some of the lessons you will in this chapter include:

- The definition and description of an insulated tank trailer
- The function of heating system in an insulated tank trailer
- Differnt types of heating systems in the tank trailers
- The trailer's tank structure

## 3.1 What is insulated tank trailer?

---

This type of trailer is used to tranport special cargo such as sulfur, liquid phenol, and asphalt/bitumen. The tank trailer has a long heat preservation duration.

Users must install the heating tubes and heating system before using an [insulated tank trailer](#) for transportation. The heating system in the tank trailer uses three major types of heating modes.



asphalt tank trailer

The modes include the steam type, coal heating, and diesel burner type.

## 3.2 The Heating System

---

The heating tubes are usually installed outside the tank to avoid polluting the liquid in transit. The tubes may pollute the liquid if they are broken.

There are three major models of heaters that used in insulated tank trailers. The models include the diesel burner, electric, and coal burner models

**Diesel Burner Type:** The diesel burner model heats fast and has a high level of efficiency. It is expensive and has a high requirement for safety. However, the combustion of the diesel burner type is inadequate. It also produces waste gas.



diesel burner tanker

**Coal Burner Type:** The heater is safe and has a simple structure. It requires easy maintenance and hence it is cost effective. However, it is inefficient and inconvenient to use.



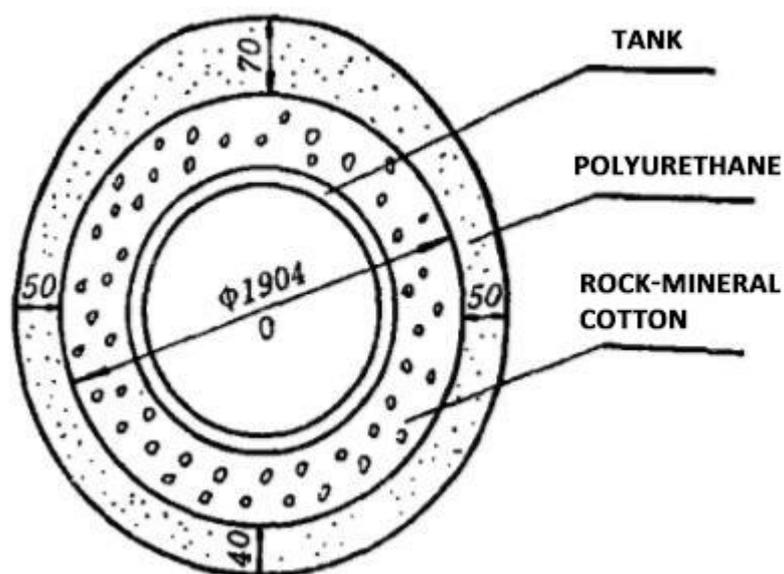
coal burner tank trailer

**Electric heating type:** This type of heating system is associated with high efficiency and no pollution. However, it's a good choice, but equipment price is higher.

### 3.3 Tank Structure

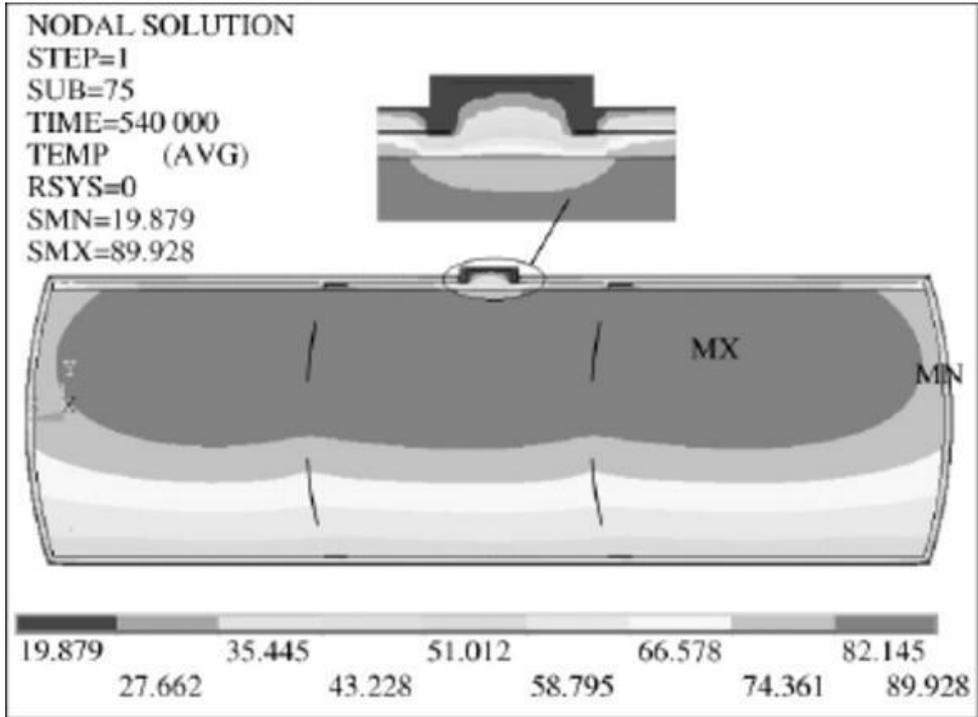
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Steel is used to make the outer and inner layers of the insulated tank trailer. The insulating materials are used to make the interlayer. The insulating materials include rock-mineral cotton and polyurethane.

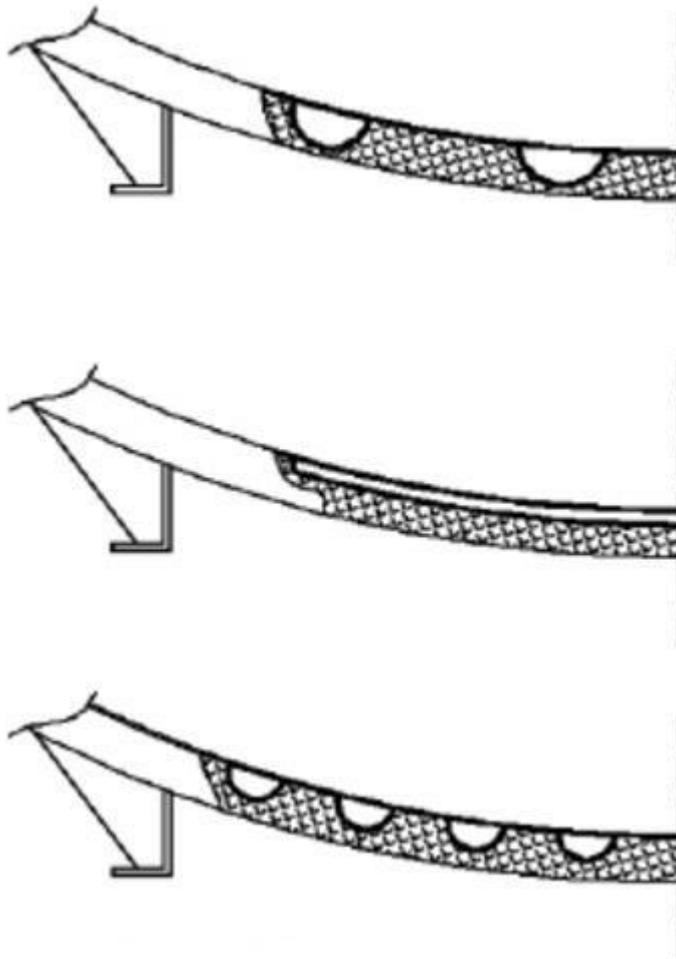


insulated tank

The heating pipe is placed at the bottom of the tank. Hence, the heat loss rate is different for the different parts of the trailer. The heat loss at the top of the tank is approximately 30% higher than the rate in other parts.



thermal distribution of tank



different structures of the heating tube

For this reason, the thermal insulation later is thicker at the top than in other parts.

**Read More:**

**Portable tanker-trailer heating system**

## **Chapter 4: CNG (Compressed Natural Gas) Tubes Trailer**

We have covered the fuel tank trailer, bulk powder tank trailer, and the insulated tank trailer in the previous sections. Let us now look at yet another common type of tank trailer, the [CNG tubes trailers](#). This chapter examines different aspects of this type of trailer. The main areas covered include:

- The definition of the CNG tubes trailer
- The main applications of CNG tubes trailers
- Different types of CNG tubes
- The manufacturing process of a CNG-1 (type one) trailer

### **4.1 What is a CNG (Compressed Natural Gas) Tubes Trailer?**

---

A CNG trailer is transportation equipment used to transport high-pressure gas. The tubes trailer may have a few or a dozen large seamless steel cylinders.

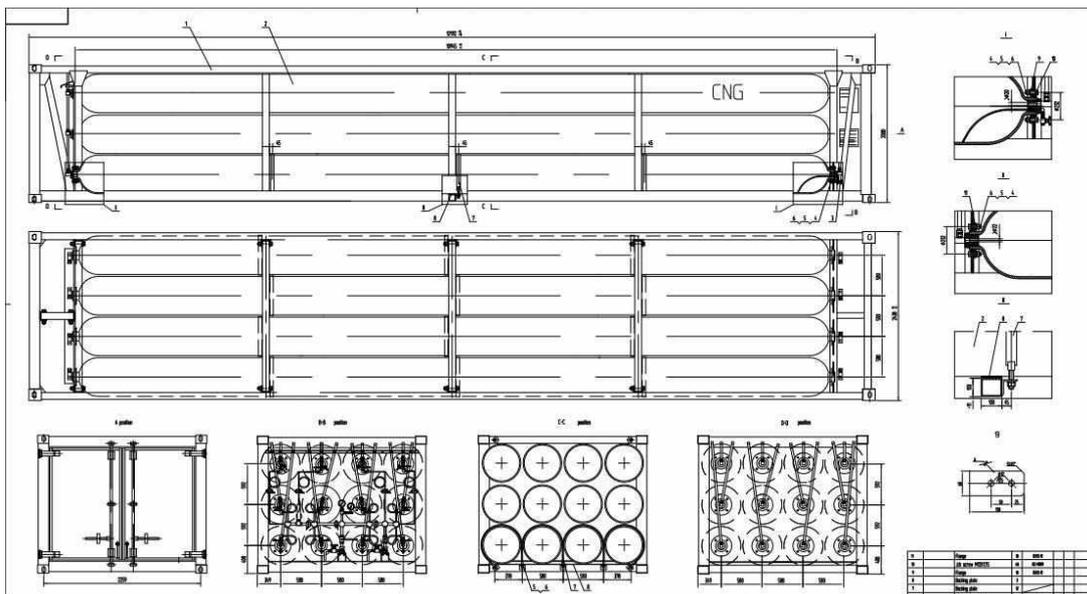
A gas tube and valve are used to connect all the cylinders. The tubes trailer is also equipped with a safety device, pressure gauge and a thermometer.

The transportation equipment is widely used in natural gas stations that are not in the CNG network. The CNG trailer's structures have a frame type and bundling type.



frame type

The cylinders of the bundling type are fixed on trailer. This type of structure can reduce the quality of framework. Hence, you can assemble more cylinders. This type has a larger volume, higher efficiency, and lower costs.



CNG tanks drawing

**Contact us, get more drawings now!!**

## 4.2 Different Types of CNG Tubes

---

CNG tubes trailers use four major types of CNG Tubes. The types include CNG-1, CNG-2, CNG-3, and CNG-4. The quality and number of filaments vary across the four types.

The higher the number of CNG tube, the lighter the quality, the more the filament, and the harder the manufacturing process. Below is a description of the materials used to make each of these models of CNG tubes.

**CNG-1 (Type one):** This type consists of steel or aluminum alloy cylinders. The type one tubes are the heaviest tubes in the market. Weight is an important consideration when choosing a CNG cylinder for your trailer.

Despite the heavy weight, type one CNG tubes are the most cost-effective tubes you will find in the market. The outside part of the tube is usually painted using a protective coating.



Type one CNG cylinder

**CNG-2 (Type two):** The model has filament wound composite gas cylinders. The inner part is made of steel or aluminum while the body the tube without the heads is wrapped using long fibers impregnated with a resin.

A composite material wrapper is in most cases to wrap the metal liner on the middle section of the cylinder. The composite material wrapper consists of woven carbon fiber or woven carbon fiber or both.

Type two cylinders use less metal and lighter composite materials. Hence, they are lighter than the type one cylinders. CNG-2 tubes are more expensive than CNG-1 tubes.



Type two CNG cylinder

**CNG-3 (Type three):** This type also has filament wound composite gas cylinders. Similar to the type two cylinders, the inner part of the tube is made of steel or aluminum.

The tube body including the heads is wrapped but long fibers impregnated with resin. A CNG-3 tank is sometimes referred to as a fully wrapped or full wrapped tank.

The long fibers used to fully wrap the body and head of the type three tube may be woven carbon fiber or woven glass fiber. Type three CNG tubes are lighter than the type one and type two tubes.

Hence, they are more expensive than type one and two tubes. CGN-3 and the CNG-4 tubes described below are the best choices if you are looking for light CNG cylinders.



Type 3 CNG tubes

**CNG -4 (Type four):** This type consists of filament wound composite gas cylinders. Unlike the type two and type three models, the inner part is made of plastic. The body of the tube is wrapped using long fibers impregnated with a resin including the heads.

CNG-4 are the lightest models in the market and hence the most expensive. The full wrapped method is used for these tubes. The composite material that wraps the tubes may be woven carbon fiber material or woven glass fiber.

The tubes rely on the composite material to reinforce the plastic inner lining. The composite reinforced wrapper supplies the strength of the CNG-4 Tubes



Type 4 CNG tank

## 4.3 The manufacturing process of the CNG-1 (Type one )

---

We have mentioned above that the manufacturing process is different for the four types. Type four is harder to process than the type one model. In this section, we will outline different stages of the manufacturing process of the CNG-1 tubes.

Before we discuss the stages, it is important to note that CNG tank trailers are used to transport high-pressure gas. Hence, the cylinders should have no welds.

Instead, the cylinders should be unibody or integrated. Hence, there is no welding in this manufacturing process, as is the case with other types of heavy-duty trailers.'

It is important to know the stages in the manufacturing process when shopping for CNG tank trailers. You need to buy a trailer who follows the full process to ensure that the trailers meet safety standards.

If any of the steps outlined below are skipped, the final product will be substandard. Hence, it will meet the safety requirements in your state.

Here now are the stages of the manufacturing process with illustrations:

1. **Steel tube inspection**

The steel tubes are in most cases purchased from other suppliers. Hence, the manufacturer has to inspect the tubes to ensure that they are made of high quality materials and have the right dimensions.

The quality of the steel tube determines the strength and safety of the finished CNG tube.



steel tube inspection

## 2. **Hot shell nosing**

We have already mentioned that cylinders in CNG trailers require no welding. Hence, the hot shell nosing process does not involve any welding.



hot shell nosing

### 3. **Bottle neck cutting**

The next stage is bottleneck cutting, which is a simple process as illustrated in the picture below. The process is necessary to simplify the process of loading the tubes with pressurized liquids.

One of the most important considerations in the bottleneck cutting process is to get the right dimensions to avoid leakages.



neck cutting

### 4. **Rough machining**

The next process after cutting off the bottleneck is rough machining, which is illustrated in the picture below.



rough machining

#### 5. **Quenching, heat treatment, and tempering**

After the rough machining process comes quenching, heat treatment, and tempering of the CNG tubes. The heating and tempering processes are necessary to increase the strength or toughness of the tubes.

The processes also remove any excess hardness. The temperature applied to the tubes depends on the desired hardness level.

Quenching refers to the process of rapid cooling that is mostly used to harden steel and other metals. Quenching prevents any unwanted low-temperature processes during the hardening process.

Quenching, heating, and tempering work together to ensure that the finished tubes are hardened enough to handle pressurized liquid loads.



heat treatment

#### 6. **Outside polishing**

After assembling and heating the inner parts of the CGN tubes, the next step involves outside polishing. The purpose of this process is to improve their outlook and prevent the surface from rusting or corrosion.



outside polishing

## 7. Hydrostatic testing

CNG tubes transport gas under high pressure. The hydrostatic test is one of the most important steps in the manufacturing process because the results determine the safety of the tube.

A hydrostatic test involves testing the cylinders for strength and leaks. A liquid is used to test the tubes for leaks. Many manufacturers add color or add to the water and use it to test the tubes to leaks.

The strength of the tube is tested by checking for any permanent deformation on the surface after filling it with a pressured liquid. Hydrostatic testing does not only ensure that the tubes meet the safety standards but also ensure that the tubes are durable.



hydrostatic testing

## 8. Steam drying

The next stage after the tubes pass the hydrostatic testing is steam drying.

## 9. Inner Shot Peening

Shot peening refers to a cold working process that relieve stress and strengthens steel parts. The process in this case is necessary to strengthen the structure of the tank. In addition, inner shot peening gives the tube a muted finish.

#### 10. Inner tube inspection

The inspection at the beginning of the manufacturing process is not enough. The tubes must be inspected again after the processes outlined above, especially the inner parts.

During this inspection, a device is inserted in the tube that sends images of the inner structure. The manufacturer can see any flaws or defects on the screen and remove them before assembling all the parts.



Inner tube inspection

#### 11. Non-destructive and air tight testing

Non-destructive testing procedures are used at this stage, which means that the process does not damage the materials of the tank body.

The air tight testing is necessary to ensure that the tank will not leak any gas out especially at high levels of pressure.



non destructive testing

## 12. Paint spraying and assembly

The last process involves assembling all the parts and paint spraying the outer surface. Paint spraying prevents corrosion and rust on the surface. The process also gives the tank body a polished outlook.



Paint spraying

[Read More:](#)

[Information About Compressed Natural Gas \(CNG\) Tanks](#)

[Filling CNG Fuel Tanks](#)

## **Chapter 5: LNG (Liquefied Natural Gas) Tank Trailer**

Tank trailers are designed to transport a certain type of gas or liquid. This chapter discusses liquefied natural gas (LNG) tank trailers in detail. The specific lessons that you will learn about these trailers in the chapter include:

- The description of LNG tank trailers
- The structure of an LNG tank trailer
- Different forms of thermal insulation

### **5.1 What is an LNG tank trailer?**

---

LNG tank trailers are designed to transport liquefied natural gas. The tank trailers are widely across globe because they are cost-effective, strong and flexible. Presently, there are two main models of [LNG tank trailers](#) in the market.

The first model consists of an LNG tank that is installed on the trailer:



Lng tank trailer

The second model consists of an LNG tank container installed on a trailer



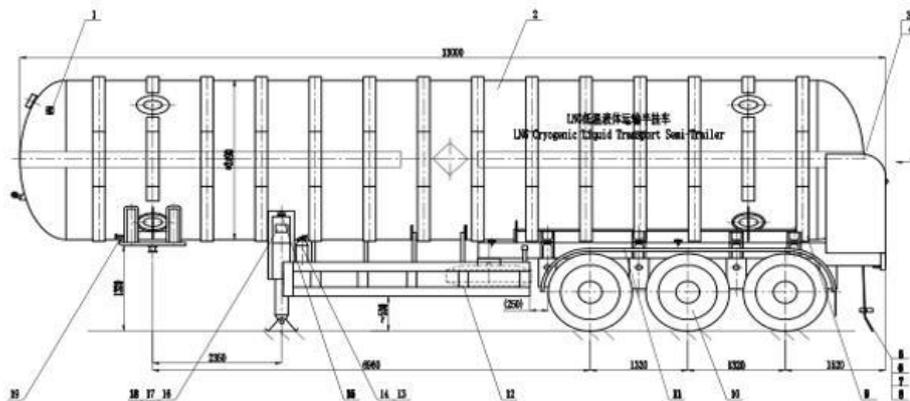
Lng container on trailer

The LNG storage tank (low temperature storage tank) is one of the LNG carriers. This type of LNG carrier works in very specific conditions. The large capacity of LNG storage tanks works under the ultra-low temperature (-162°C).

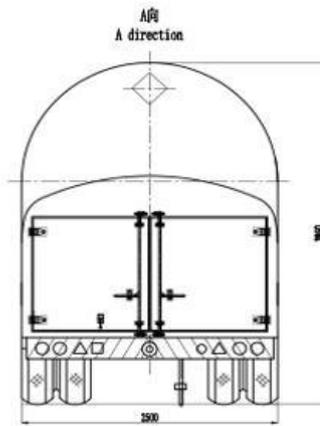
The trailer is more particular than other types of LNG tank trailers. When tank trailers are transporting LNG, the liquified gas boils and continues to gasify. Several conditions contribute to the continuous boiling and gasification.

The conditions include external heat invasion, the impact or filling, and the change in the atmospheric pressure. Any of these conditions or a combination of the conditions will cause the LNG to gasify.

Hence, manufacturers must consider the pressure control in the tank, gasific gas extraction, and refrigeration cooling when designing LNG tanks.



- 技术要求**
1. 本车为运输液化天然气的专用车辆, 罐体可采用真空多层绝热结构形式, 罐体设计、制造、检验均按《压力容器》、《移动式压力容器安全技术监察规程》、《移动式压力容器安全技术监察规程》及《移动式压力容器安全技术监察规程》进行设计、制造、检验和验收, 同时按《移动式压力容器安全技术监察规程》GB 26162-2011《移动式压力容器安全技术监察规程》及《移动式压力容器安全技术监察规程》进行设计、制造、检验和验收。
  2. 内罐材料采用 Q345R, 其化学成分及机械性能应符合 GB 713-2008《承压设备用钢板和钢锻件技术条件》的要求, 外罐材料采用 Q345R, 其化学成分及机械性能应符合 GB 713-2008《承压设备用钢板和钢锻件技术条件》的要求。
  3. 本车所有材料均应符合国家现行标准的要求, 如: 金属材料、焊接材料、无损检测材料、无损检测设备等, 均应符合国家现行标准的要求, 并应符合国家现行标准的要求。
  4. 罐体与管嘴连接处应采用全焊透对接接头。
  5. 罐体出厂前, 内罐体及管嘴应经 0.02~0.024MPa(表压)干燥氮气密封试验合格, 且不得有渗漏现象。
  6. 本车的罐体与管嘴连接处应采用符合 GB 150-2008《压力容器》及 GB 150-2007《压力容器》的要求。
  7. 本车的罐体与管嘴连接处应采用符合 GB 150-2008《压力容器》及 GB 150-2007《压力容器》的要求。
  8. 本车的罐体与管嘴连接处应采用符合 GB 150-2008《压力容器》及 GB 150-2007《压力容器》的要求。
- Technical Requirements**
1. The tanker is the special vehicle for LNG transportation, the tank form adopted is high vacuum multi-layer insulation, the tank is designed, manufactured, inspected and accepted in accordance with GB 150-2008 Pressure Vessels and GB 150-2007 Code for Design and Manufacture of Pressure Vessels for Cryogenic Liquid, and under supervision of TSG R0005-2011 Supervision Regulation on Safety Technology for Transportable Pressure Vessel and Amendment 1 published by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ).
  2. The main body material of inner tank adopts Q345R, its chemical composition and mechanical property shall conform to the relevant requirement of GB 713-2008 Steel Plate, Sheet and Strip for Pressure Equipment; The main body material of outer shell adopts Q345R, its chemical composition and mechanical property shall conform to GB 713-2008 Steel plates for boilers and pressure vessels.
  3. All the outlay accessories of this tanker shall meet the requirements, such as safety valve, level gauge, pressure gauge, valve, fire extinguisher etc. shall meet the requirements of GB 150-2008 Pressure Vessels and GB 150-2007 Code for Design and Manufacture of Pressure Vessels for Cryogenic Liquid, and only can be assembled after performance calibration accepted in accordance with the relevant standard or rules. The pressure gauge shall with inspection certificate issue by the metrology department (The department supervise weight measuring).
  4. The connection between the tanks and conducting electrostatic grounding device should not be more than 5 G.
  5. Inner vessel and tubing system shall fill with dry nitrogen gas with pressure ranging from 0.02~0.024MPa (Gauge reading) and seal all the pipes and valves for gas leakage before delivery.
  6. The paint and finish shall meet the requirements of GB 150-2008 Coating and Packing for Pressure Vessels Transport and well as GB 150-2007 Code for Design and Manufacture of Pressure Vessels for Cryogenic Liquid.
  7. The complete vehicle performance of tanker shall be tested and accepted as per GB 150-2008 General Terms for Semi-trailers after general assembly.
  8. The loading of the vehicle only can be used when the tank is empty status.



LNG tank trailer drawing

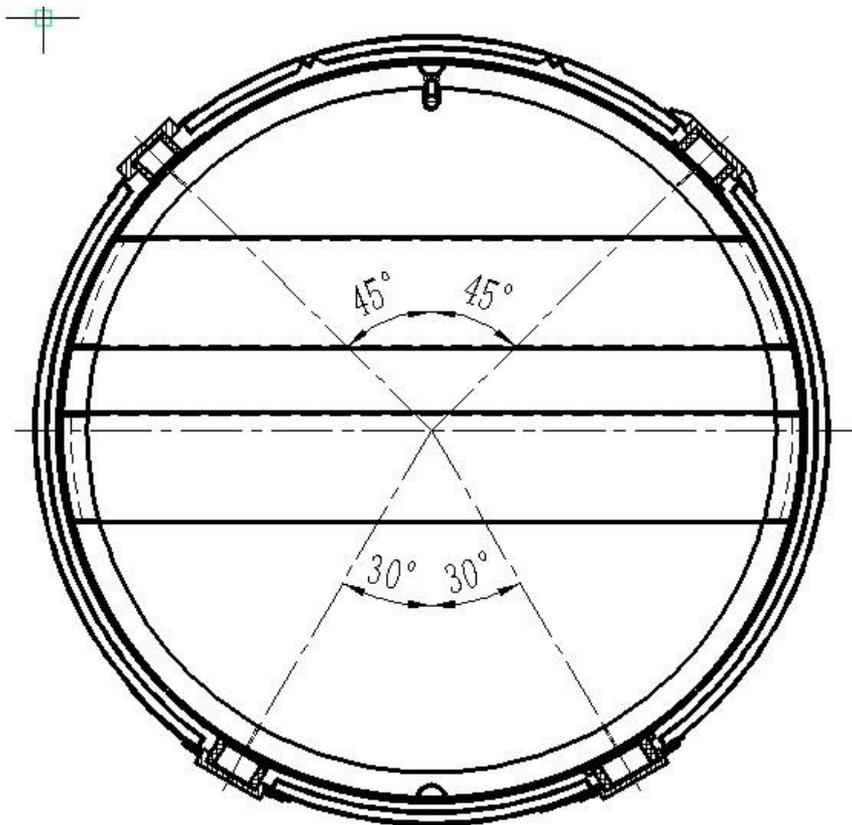
**Contact us, get more drawings now!!**

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## 5.2. Tank Structure

An LNG tank has eight supporting points between the inner vessel and the outer jacket. The designs of the rear four supporting points and the front four supporting points are different.

The different designs prevent the rear tubing breakaway due to the expansion and contraction of the inner vessel. The rear four supporting points are fixed while the front four supporting points have a sliding design.



LNG Tank Structure

the connecting support between inner vessel and outer jacket shall be reliable and bear the inertial force load impact below:

- Movement direction, two times of the maximum weight
- The horizontal direction which perpendicular to the movement direction, the maximum weight
- perpendicular direction up, maximum weight
- perpendicular direction down, two times of maximum weight

### **5.3 Different forms of thermal insulation**

---

At present, four forms of thermal insulation are used in LNG tank trailer. The four types include:

1. Packed heat insulation
2. High vacuum heat insulation
3. Powder fiber insulation (vacuum)
4. High vacuum multi-layer insulation (vacuum)

In this section, we shall introduce you to the highest form of insulation, which is the high vacuum multi-layer insulation. The insulation has an alternate structure that is made of highly reflective and low thermal conductivity material.

The high vacuum multi-layer insulation requires a vacuum to eliminate the gas heat transfer and thermal conductivity.



Insulation materials

The multilayer thermal insulation material is composed of two kinds of material. The first kind is the highly reflective and lowly emissive materials such as aluminum foil, or aluminum polyester film.

The second type consists of materials with low thermal conductivity and low deflation rate to function as the spacer material. Examples of such materials include glass fiber cloth, fiber paper, nylon mesh and mesh wire.

Due to the low thermal conductivity in the second type of materials, there is a middle layer between each reflection screen materials and reflective screen materials.

Hence, it can reduce the thermal conductivity of solids effectively. The main advantages of the high vacuum multi-layer insulation include:

- The insulation is super adiabatic
- Low thermal conductivity
- The thermal insulation space required is little
- The effective mass is light
- The insulation is suitable for transporting liquids with a low boiling point

[Read More:](#)

[What is the difference between LNG, LPG and NGLs?](#)

## **Chapter 6: LPG (Liquefied Petroleum Gas) Tank Trailer**

This chapter discusses Liquefied Petroleum Gas (LPG) tank trailers. Some of the aspects of the trailers covered include

- The applications of LPG tank trailers
- The structure of LPG tanks
- The safety accessories in LPG tank trailers

### **6.1 What is an LPG tank trailer?**

---

An LPG tank trailer has a different structure and applications from a LNG trailer. [LPG tank trailers](#) are used to transport a variety of liquefied gases including liquid ammonia, propane, propylene, dimethyl ether, isobutane, and butadiene.



## 6.2 LPG Tank

---

The LPG tank has a cylindrical shape for two main reasons. The first reason is the high pressure of the liquid cargo. The second is that the manufacturing process of cylindrical tanks is simple.

Sometimes the LPG tanks are designed in a cylindrical shape but different diameter. The purpose of this design is to lower the center of gravity for the tanks.



lpg tank trailer

The cylinder is made of cold roll forming while the heads are standard elliptical. All joints on the tanks must go through a full penetration type of double-sided welding.

In addition, they must go through a 100% flaw detection. The processes are necessary because the tanks are used to store high-pressure gas.

Material	Yield strength (Mpa)	Permissible stress (Mpa)	Comparison
Q235-C	225	125	The permissible stress of these two materials is small. Thus, the wall thickness of the tank is thicker and the empty weight is larger and hence the load capacity is less.
20R	235	133	
16MnR	345	170	The wall thickness is moderate, that is, 10-14mm. It is the commonly used materials in the current manufacture of LPG tanks. The welding technology is mature and the price is suitable.
15MnVR	390	177	Performance is similar to 16MnR. However, price of the material is high.

Four materials are usually used to make LPG tanks. The materials include Q235-C, 20R, 16MnR, and 15MnR. The table below shows the comparison of the four materials, their yield strength, and permissible stress.

From this table, it is clear that 16MnR is the most appropriate material to use. Under the -40° C impact test, the Akv of the 16MnR is greater than 21J.

## 6.3 Safety accessories

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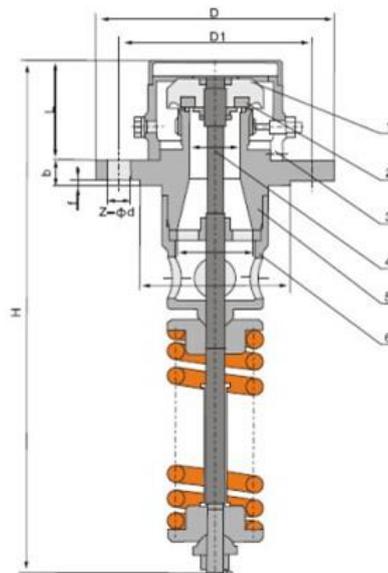
LPG tanks have safety accessories to ensure that the high-pressure gas reaches its destination without any leakages, incidents or accidents.

The accessories include a safety valve, an emergency shutting-off system, and an electrostatic eliminating device. Each of these safety mechanisms is discussed below.

### 6.3.1 Safety valve

Whenever the pressure inside tank exceeds the optimal level, the relief valve opens automatically. The gas inside is discharged rapidly, which makes the pressure to reduce.

When the tank drops back to the safe pressure level, the relief valve shuts down to avoid the danger of over-pressure.



safety valve

#### **Characteristics of safety valves:**

- The stress can be tightly closed when the pressure returns to normal
- The opening pressure of the relief valve is not greater than 1.1 times the design pressure
- The closing pressure of the relief valve is not less than 0.8 times the opening pressure

### **6.3.2 The Emergency Shutting-off Valve**

When the unloading pipe is damaged, the emergency shutting-off system cuts off the flow. In case the unloading valve fails and the gas or liquid leaks out, the emergency cut-off valve can stop the leakage.

In case of a fire or the temperature of ambient rises above 70 C, the emergency cut-off valve will stop the outflow.



emergency shutting off valve

### **6.3.3 The Electrostatic Eliminating Device**

When loading and unloading the tank, the liquid under high speed will produce electrostatic because of friction. The electrostatic can cause fire if it is not eliminated promptly.

Hence, an electrostatic eliminating device must be installed in the tank. With the device in place, the resistance is small.

**Read More:**

**Liquefied petroleum gas**

## **7.0 How To Inspect The Welding Quality Of The Tank**

Welding is an importance process of manufacturing a tank trailer. Inspecting the welding quality is important because tank trailers are used to transport dangerous liquid or gas. The purpose of the inspection is to ensure that the tank will not leak and cause an accident. In this section, we will show you how to inspect the welding quality of a tank trailer.

Welders need to follow the Welding Procedure Specification (WPS) when working to ensure that the welding process is of high quality. Even if the welders follow the WPS guideline, you still have to inspect the welding line after the work is complete.

Some of the aspects to look out for during the inspection are cracks or defects in the materials and in the welding line. Several methods are used to detect these cracks or defects. The methods include X-ray flaw detection, ultrasonic inspection, magnetic powder inspection, penetration inspection, and gamma ray flaw detection method. All the methods are NDT, that is, they are nondestructive inspection.

NDT refers to a detection methods that does not damage the work piece or raw materials. However, the method can still detect the surface of the parts and internal quality of material. Some of the methods used to check welding quality in tank trailers are discussed below.

### **7.1 Magnetic Powder Inspection**

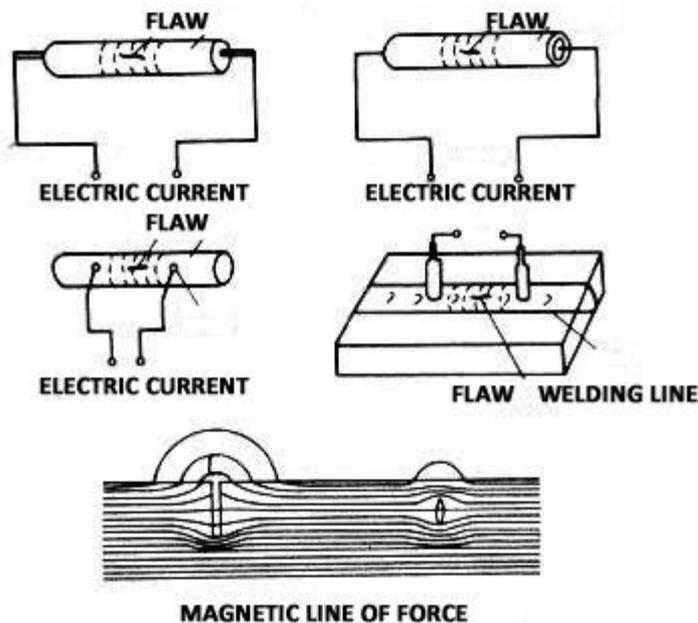
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Magnetic particle inspection is a method used to detect the defects on the surface or near the surface of ferromagnetic materials. The materials include all the substances that show strong magnetism whenever a magnetic field is applied.

The inspection process involves magnetising the surfaces of all parts or welded joints. If the parts or joints have any defects, the magnetic powder will gather around those defects.

Hence, it is easy to detect where the defects by observing the movement of the magnetic powder.

The main advantages and disadvantages of magnetic powder inspection are outlined below:



Magnetic Powder Inspection

### Advantages

- The method requires simple equipment
- The operation of the equipment and inspection is easy
- Testing defects or cracks through this method is fast
- Magnetic powder testing has high detection sensitivity
- The method can be used to find defects on surfaces or near surfaces of ferromagnetic material, carbon steel, and some alloys
- It is suitable for inspecting thin walls or weld surface cracks

- Magnetic powder inspection can show unsoldered defects of a certain depth and size
- The test method can work through coating thickness and contaminant layer
- It is inexpensive compared to other methods
- Magnetic powder inspection is suitable to high-volume production inspection

### Disadvantages

- It is difficult to find the air bubble, the cinder inclusion, and the defect hidden in the deep
- The method is limited because the material must be ferrous for the defects to be detected
- It requires care to avoid burning in case the welded parts have any electrical contact
- You must demagnetization and cleaning of the tested parts is necessary after the inspection
- The method requires proper alignment of the magnetic field and the defects for it to be effective
- It works best on smooth surfaces and hence may be ineffective on rough welded parts
- Tanks trailers are often painted or polished, which interferes with the sensitivity of the testing method

## 7.2 Ultrasonic Welding Inspection

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Ultrasonic welding inspection can penetrate into the depths of metal materials. The ultrasonic wave goes from the surface of the part to all other sections. The wave goes back when it reaches the edge of the interface.

Hence, ultrasonic welding inspection can be used to check the parts when the ultrasonic wave encounters an interface. The detection appears as a pulse on the screen. Workers use the pulse waveform to determine the position and size of the defect.

Inspectors can also detect any changes in the thickness of the materials. Ultrasonic testing is also used to measure the changes in the properties of materials. The testing method is used to locate defects on the surface or subsurface of different materials including metals, wood, and plastics.



Ultrasonic Inspection

### Advantages

- Ultrasonic testing has high detection sensitivity than X-ray flaw detection
- It takes a short period to complete the testing
- The method is cost effective
- It requires only single sided access
- It is flexible, convenient and efficient
- It is harmless to the human body
- Minimal preparation of the parts is required
- It provides distance information
- Ultrasonic testing detects more than flaws. It detects changes in thickness and properties of materials

### Disadvantages

- It requires a smooth surface to be effective
- Ultrasonic testing requires an experienced inspector who can identify different type of defects because the defects are not visual
- It is suitable for thicker and larger welding line and parts. It is difficult to inspect thin parts with this method
- Linear defects that are parallel the ultrasonic wave may be undetected
- The surface of the part should be accessible to couplant and probe

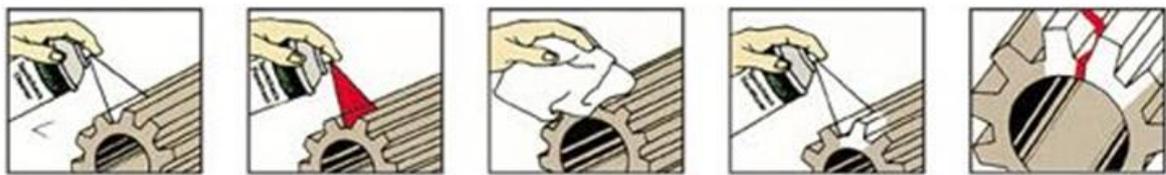
## 7.3 Penetrate flaw detection

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With this method, the surface of the component to be tested is first cleaned. The penetrant solution is then applied on the clean surface and pulled down to the defects through capillarity action.

The surface is then cleaned to remove any residue of the infiltration liquid. However, some residue of the penetrant or infiltration liquid will remain on the defects. The capillary action of the imaging agent (solvent developer) is used to absorb the residual fluid in the defect and achieve the goal of defect inspection.

Penetrant inspection is mostly used to detect porosity, cracks, and other defects that are able to break the surface of the material. The flaws should have enough volume to trap and hold the infiltration liquid.



Penetrant flaw detection

### Advantages

- The method tests large areas or surfaces effectively and efficiently. Large surfaces are inspected fast and at a low cost
- It does not require any complex equipment
- Defect display is intuitive
- It can be applied to parts with complex geometry

### Disadvantages

- Penetrant testing can only detect flaws that break the surface of the material
- It is difficult to find the air bubble, the cinder inclusion, and the defect hidden in the deep
- The method requires smooth and nonporous surfaces
- The inspectors must clean the residue liquid after inspection
- It consists of multiple operations that require controlled conditions
- Inspectors must follow safety guidelines when handling chemicals to avoid fire, toxicity and other incidences

## 7.4 X-ray flaw detection

---

This inspection method is also referred to as radiographic testing. X-rays are mostly used in the inspection to produce images of the parts using a detector that is highly sensitive to radiation.

Sometimes gamma rays and other high-energy rays are also used in the inspection. The part or object that is being tested is placed between the detector and the source of the radiation.

The density and thickness of the materials that the rays must penetrate through determine the amount of radiation that reaches the detector. The difference in radiation projects an image on the film or detector. This image shows the internal features of the inspected part including any flaws or defects.

X-rays are used to detect flaws on surfaces and subsurfaces of all types of materials. The process is also used to detect the thickness of materials and location of hidden parts when assembling equipment.



X ray flaw detection

### Advantages

- The method can be used to inspect all types of materials
- It is precise and highly efficient
- It can detect defects on the surface and subsurface
- X-ray inspection can be used to detect flaws on parts with complete shapes or geometry and multiple layers without disassembly the parts
- The part requires minimal preparation before testing and no cleaning after inspection

### Disadvantages

- The method requires complex and expensive equipment
- It require a well trained and skills inspector
- It requires access to both sides of the part or structure
- Inspecting thick materials take a longer period
- Radiation is harmful to the human body

## Chapter 8: How to Buy a Tank Trailer

You have learnt about different types of tank trailers, their structures, and applications in the previous chapter. This information is necessary to help you decide the type of tank trailer that will suit your business. The right type depends on the type of cargo that your business handles. Once you identify the type, you must do your homework to pick the right model or brand in the market.

In this chapter, you will learn how to choose the best model of a tank trailer. You will learn all the considerations you should make before ordering for a tank trailer from any manufacturer.

### 8.1 Standard and Certification

---

The standards and certification requirements of tank trailers vary across countries. You need to check the requirements in your country before purchasing a tank trailer.

If you fail to check the standards and certification, you may buy a tank trailer that you cannot use in your country. The standards in most cases outline the dimensions and safety measures that a tank trailer must have to be used in the country.

Government bodies certify brands based on their quality and safety. Confirm if the manufacturer's brand of tank trailers are allowed in your country.

Some manufacturers have different models of the same type of trailer with varying specifications. You need to check the standards for the requirement for the specific you intend buy.



BV certification of CNG tubes

## 8.2 Inspect the supplier's strength

A tank trailer may meet the standard and certification requirements in your country but fail to meet your needs. Tank trailers transport flammable gases and liquid.

Hence, you must be careful to pick trailers with high-quality tanks. The manufacturer must follow the right production step without skipping step to ensure that the final product is safe.

Any leakages of liquid or gases in transit is risky to the driver and other road uses.

Some of the worst road accidents involve tank trailers that leak and burst into flames. Avoid manufacturers that do not follow production procedures. Many of them cut off some procedurs to save the overall production cost.

Such manufacturers may offer cheaper tank trailers but the risks involved in driving such trailer are high. You need to study the reputation of a supplier before purchasing to ensure that the supplier is committed to safety and quality standards.

One of the inspections to make before buying is confirming that the quality control steps are complete. Refer to the manufacturing processes outlined in chapter 4.3 above for CNG tank trailer.

The information therein will help you determine if the supplier followed all the steps for these types of tanks. One of the most important steps for tank trailer that carry high pressure liquid and gas is welding.

The quality of welding for these types of trailers determines their ability to handle the high pressure. The considerations to make when inspecting the quality of welding include:

- Ensure that the tanks can work effectively under high pressure
- Ensure that the tanks have no leakages
- Check if the tanks are stronger and not easily damaged

The purpose of preparing this guide is to help you conduct such inspection on your own. It is advisable to compare different models and inspect each thoroughly. Careful inspection will save you from fatal accidents associated with low-quality tanks.



Supplier's strength

# Chapter 9: What you Should Pay Attention to and How to Ensure Safety When Driving a Tank Trailer

With the information provided in this guide, you can buy a durable model of a tank trailer. However, the tank may develop mechanical issues or cause fatal accidents if you ignore critical safety measures. In this chapter, you will learn about the key aspects of the tank trailer that you should pay attention when driving. We have outlined different types of tank trailers about. The driving safety measures below apply to all types of tank trailers.

- **Loading the tank**

One of the most important safety measures when handling a tank trailer is following the right procedure when loading the tank. Proper loading is important is to avoid liquid surge, which is common when a tank is half filled.

The liquid in the tank may surge back and forth when the driver stops the trailer. The surge tends to push the trailer in the direction of the wave. Such movements are dangerous on slippery

Given the risks of a liquid surge, it is important to ensure that the weight of the liquid is equally distribution for tanks will different compartments. In addition, the driver must leave enough room for the liquid to expand.

The room required depends on the type of liquid being transported. The most important factors to consider the determine the amount of liquid to load in a tank include:

- The expansion rate of the liquid
- Legal weight limits in the country
- The weight of the liquid
- The temperature of the load

Inspect all the valves before loading to ensure that there are in the right position. Otherwise, they will not function as required especially in times of emergencies. Inspect

the emergency shut off systems, cut off valves, intake and discharge to ensure that they are in the right place.

- **Inspecting the tank trailer**

It is important to inspect the tank trailer just before driving even after following the right loading procedures. Start by inspecting all around the trailer to ensure that there are no leakages.

Do not driving if the loaded gas or liquid is leaking, even if the leakage is small. Check if all the manholes and valves are covered. Driving a tank trailer with open valves is risky.

Inspections are necessary during the regular maintenance services. However, it is important to recheck the parts before loading new cargo.



Tank trailer leakage

- **Safe driving tips**

After ensuring that the tank trailer is in good condition to transport the gas or liquid, observe the following tips for your safety:

1. **Control the surges**

We mentioned that liquid surges can cause the trailer to roll over when stepping on the brakes. Some tanks have baffles that control the forward and backwards movements of the liquid.

However, the side to side surges will still occur, which can cause an accident when not controlled. One way to control the liquid surges is to keep the pressure on the brakes steady. Avoid releasing the brakes when stopping the trailer.

Another tip to control the surge is to start braking while still a distance away from the stop. Sometimes you must use the emergency brakes to avoid an accident.

In such cases, use stab or controlled braking and avoid steering quickly while applying the brakes. Quick steering can make the tank trailer to roll over.

## 2. **Keep a long stopping distance**

The stopping distance is not only important in controlling liquid surges but also for the safety of other motorists on the road. Determine the safest stopping distance depending on the type of the road.

For instance, you need to double the normal stopping distance when driving on wet roads. Consider the weight of the tank trailer as well. An empty tank trailer is lighter and normally takes a longer time to stop than a fully loaded tank trailer. Hence, you need to increase the stopping distance when the tank empty.

## 3. **Drive smoothly**

Start, reduce speed, and stop the tank trailer smoothly. The center of gravity of most tank trailers is high when loaded. Hence, the level of stability of the trailer is low. Driving smoothly especially when changing lanes or turning the trailer improve its stability.

In addition, driving smoothly helps you to control the surges. Be careful when approaching curves on the road. Slow down the trailer before you get to the curve and then accelerate gradually as you navigate the curve.

## 4. **Avoid skidding**

One major cause of accidents and incidents on the road involving trailers is skidding. If you over brake, over steer, or over accelerate, the trailer is likely to skid.

If you notice that the wheels are skidding while driving, move fast to restore normal traction. Failing to act on time may cause the trailer to jackknife, which simply means that the trailer slid towards the front the truck.

At this point, the trailer has exceeded the normal 45 degrees angle. Practice driving the tank trailer smoothly whether loaded or empty. Skidding and subsequently jackknifing is common on wet and icy roads.

#### 5. **Observe speed limits**

Many accidents occur when drivers ignore speed limits. Watch the speed limits on the road and drive within those limits. Avoid the temptation to speed up when the road seems clear.

Consider the weather as well to determine the most appropriate speed. You may need to drive a slow speed during the icy and wet weather to avoid skidding. Hence, it is important to get weather updates before starting any trip.

## Chapter 10: What You Should Notice During Maintenance of a Tank Trailer

Tank trailers require proper maintenance to function at their full capacity. The components will not function according to the manufacturer's specification if you ignore service and maintenance. Tank trailers are used to transport dangerous and hazardous materials. If any part fails while the trailer is on the road and cause a leakage, the incident may lead to loss of lives.

Countries have different standards on how to transport dangerous materials on the road. The standards include the conditions of the transporters. Hence, maintaining your tank trailer in good condition is a legal requirement. The good news is that top manufacturers give a manual on how to take care of your tank trailer. Here are some of the major parts that you must check during the maintenance process.

1. **Valves and pressure gauge:** Always check all the valves including the hydraulic, safety, vacuum and pressure valves. Ensure that each valve function as it should and is properly lubricated. Sometimes valves freeze during the cold weather, which causes them to malfunction. Clean the valves and lubricate them regularly. All the valves should have no residue or corrosion. Check the pressure gauge as well to ensure that it is in good condition and working properly.
2. **Tank:** The most important aspect to consider when maintaining the tank is leakage. Inspect the tank for any holes that may cause the gas or liquid to leak. Seal any leaking parts on the tank. Check for any bents or deformations on the body of the tank. If such deformations are left unchecked, they may lead to

cracks as pressure changes during the loading and unloading processes. The body of the tank should be smooth and even. Clean the tank regularly and polish its surface to prevent rust.

3. **Tires:** Maintaining tires regularly to avoid rollovers. Inspect the tires for wear and any damages and replace any worn out tires. Ensure that the air pressure is at the right level at all times. Poorly maintained tires can easily cause an accident because they do not have the required traction on the road.
4. **Bolts:** Tighten all the bolts during maintenance including the shock absorbed bolts, u-bolts, and slewing ring bolts. Every bolt in the tank trailer must be tight enough to maintain its strength and stability. Replace any damaged bolts with new bolts and ensure to pick the right dimensions.

We have outlined a few of the components of tank trailers that must be checked regularly. However, all the other parts are also important and require proper maintenance.

Follow your manufacturer's guidelines on how maintain the tank trailer especially when replacing parts. Manufacturers give specific dimensions and quality of parts that should be used in their tank trailers.

In addition, follow the safety guidelines given in your country for such transporters.

## Conclusion

Tank trailers are designed to carry different types of gases, liquids, and powder. The main types of tank trailers include fuel or tank trailers, CNG, LPG, bulk powders, insulated and LNG tank trailers. The names suggest the type of cargo that the tank trailers transport. Each of these tank trailers has a specific manufacturing process especially for the cylinder. The body and inner structure of the tanks are designed based on the type of cargo. Steel and aluminum alloy are mostly used to make the body of the tank trailers.

Tank trailers mostly transport gases and liquid under pressure. Hence, the cylinders must strong enough to withstand the high pressure. Choosing and maintaining the right model of a tank trailer is important because of the risks involved. Tank trailers carry dangerous gases and liquid that are harmful to human health. In case of leakages, some of the gases and liquid may explode and cause loss of lives. Hence, you must insist on buying a tank trailer who follows the right manufacturing process.

Careful inspections are necessary before buying a tank trailer. The inspections are also necessary before loading or transporting any cargo with the trailer. Some of the most important components include the cylinder or tank, welded joints, valves, and pressure gauge. Tank trailer operators must use the right loading process, that is, top loading for their safety. In addition, the operators must drive the tank trailers smoothly especially on wet roads to avoid accidents. Loaded trailers roll over easily when driven at a high speed especially near curves and bends.

You can purchase a high-quality tank trailer that will endanger the lives of your workers or road users if you follow this guide. The most important thing is to inspect the components and ensure that you buy from certified suppliers. The right supplier should follow the safety standards and requirements in your country to customize your tank trailer. Always check the body, tires, joints, and valves in the regular maintenance procedures to keep your tank trailer in a good condition.

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