To ensure safe operating procedures, follow safety rules, practice proper maintenance and use common sense.

General service tank cars are equipped with various top and bottom fittings to allow loading, unloading, gauging and testing operations. For additional information, read AAR BOE Pamphlet 34, your company’s instructions, applicable government regulations, and AAR’s NAR web site at nar.aar.com.

SAFETY VALVES & VENTs

The purpose of a safety valve or vent is to prevent the tank pressure from exceeding a specified limit. A SAFETY VALVE is re-closed after this limit is exceeded and excess tank pressure has been relieved. A SAFETY VENT does not re-close and requires that a flangible disk (rupture disk) be replaced every time a pressure relief event occurs. The pressure setting on general service safety valves and vents is 165 psi maximum.

Safety valves and vents are typically mounted on the fittings nozzle cover plate or on a separate tank nozzle specifically for the safety valve. Safety vents may be mounted on the mansway cover plate as well.

MANWAY AND FILL HOLE NOZZLES

A manway consists of a flanged nozzle located at the top of the tank. It is equipped with either a bolted cover or a flanged and bolted cover with a gasket to prevent a seal in the closed position. Hinged manway covers are typically sealed with eye-bolts that rotate into position for tightening.

A gauge hole is typically located on the inner edge of the manway nozzle. It serves as one means of verifying the required outlet space in the tank. It consists of a scale that indicates the fill level of the tank.

FITTINGS NOZZLE AND ATTACHMENTS

A fittings nozzle consists of a flanged nozzle with a bolted cover plate and gasket. A number of devices are mounted to the cover plate. Mounting connectors to the cover plate may be either flanged or bolted and screwed.

The liquid valve is typically a ball type valve that is used for both loading and top unloading of the tank. For top unloading, it is connected to a pipe mounted to the fittings nozzle cover plate that extends to within 2” of the inside bottom of the tank. These pipes are called reduction pipes. Reduction pipes may be of the stiff or flexible type.

For bottom unloading, a bottom operated ball valve (BOV) is mounted as a saddle at the opening of the tank and operated at ground level (See Figure 2). Some cars of older vintage are equipped with a “Plugs Positive” or top-operated BOV (See Figure 2) for bottom unloading. This is essentially a plug type valve mounted to a saddle on the bottom of the tank that is controlled at the top of the tank via a red actuator. When the valve cover is removed, it may be inverted and used as a tool to operate the valve.

The vapor valve is typically a ball type valve. It is usually attached to the top of the fittings crownplate using flanged or screwed connections. Since it does not extend into the liquid, it will only expel vapor when opened.

During a top unloading process, the unloading line is attached to the liquid valve, and an air or gas line is attached to the vapor valve. Pressure is applied to the tank by forcing air or an inert gas into the vapor space of the tank through the vapor valve such that the tank contents are forced through the ejection tube.

During a bottom unloading process, the mansway cover or vapor valve is opened to vent the tank. The pipe on the BOV cap is removed to ensure the valve is not leaking. The cap is then removed, and the unloading hose is attached to the outlet nozzle of the BOV. When the vapor valve is opened, generally allows air to flow to a pump which then moves the commodity to its destination.

Most valves have self-lubricating Teflon packings and Teflon seats. Therefore, no special maintenance is necessary. They are designed to be closed only hand tight. Wrenches pry-bars or other mechanical devices may potentially damage these valves.

THERMOMETER WELL

A thermowell is a long tube mounted to the fittings crownplate that extends into the tank and is typically filled with antifreeze. A screwed cap is removed from the top of the thermowell, and a long thermometer is inserted into the thermowell to measure the temperature of the antifreeze. The temperature of the antifreeze is representative of the temperature of the tank contents.

VACUUM RELIEF VALVES

Vacuum relief valves are typically located on the fittings arrangement nozzle. Their purpose is to prevent implosion of a sealed tank in the event that residual vapor cools and condenses into a liquid, thereby resulting in negative pressure inside the tank.

HEATER COILS

Some tank cars are equipped with heater coil systems for the purpose of heating the tank contents to facilitate unloading. Heater coils may be located on the interior or exterior of the tank. Steaming is the typical heating medium, although hot oil is sometimes used to achieve higher heating temperatures. In some cases, auxiliary heating systems are fed by the heater coil system to allow localized heating of valves and fittings.

Interior heater coils are supported by brackets mounted to the bottom interior surface of the tank. Interior heater coils offer more efficient heating of the tank. However, the use of interior coils has diminished significantly due to the potential for product contamination and extensive maintenance.

Exterior heater coils are located on the exterior surface of the tank in a serpent type pattern and utilize a low profile, oval shaped coil section. The heating medium is fed to the coil system via threaded coil nipples.

The design pressure of the coils is 200 psi, and the maximum recommended operating temperature is 356°C. The maximum temperature of the heating medium is limited to 210°C for a foam insulated car and 440°F for a glass wool blanket insulation system.

To order additional Do’s and Don’ts posters for general service Cars and LPG and anhydrous ammonia Cars, go to the GATX Rail web site (www.gatxrail.com) or contact GATX Rail Communications at 312.621.8008 or fax 312.621.6698.

DO’S AND DON’TS

Of General Service Tank Car Handling

Do’s

- Strain cars for adequate ventilation.
- Open manway cover prior to pressure buildup or as product changes. 
- Contact tank house for hazmat and safety input prior to loading.
- Monitor and control temperature.
- Inspect outlet unloading connections for freezing damage. If no damage or cracks are evident, apply input to outlet connection immediately prior to commencement of unloading.
- Contact proper authority.
- When unloading heated car with dry air to ensure no vapor is left in coils which could freeze and damage then. Leave car uncooled.

Don’ts

- Do not apply steam to coils too quickly.
- Do not overpressure coils.
- Do not heat car without monitoring using input.
- Do not apply steam to a lined car that is less than half full or when the probability of freezing the liner is high.
- Do not attempt to force open a frozen outlet valve.
- Do not leave car full of commodity once loaded and heated.

Unloading Arrangements

1. MANSWAY
2. GAUGE BAR
3. PORT AFTERMAN
4. VACUUM RELIEF VALVE
5. DANGERS TO AVOID
6. SAFETY VALVE
7. OUTLET VALVE
8. 1st or 2nd LOCATIONPIPE/PIPE SAMPLE LINE ONE OF 2 LOCATION PIPE SAMPLE LINE TWO OF 2 LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE LOCATION PIPE/PIPE

WARNING

To what do you think your product is frozen?

UNLOADING: DO’S

- Blow out heater coils with dry air to ensure no water is left in coils.
- Commence unloading.
- Don’t apply steam to a lined car that is less than half full or when the probability of freezing the liner is high.
- Don’t apply steam to a liquid valve, and an air or gas line is attached to the vapor valve. Pressure is applied to the tank by forcing air or an inert gas into the vapor space of the tank through the vapor valve such that the tank contents are forced through the ejection tube.

UNLOADING: DON’TS

- Don’t apply steam to coils too quickly.
- Don’t overpressure coils.
- Don’t heat car without monitoring using input.
- Don’t apply steam to a lined car that is less than half full or when the probability of freezing the liner is high.
- Don’t attempt to force open a frozen outlet valve.
- Don’t leave car full of commodity once loaded and heated.

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