

A Generally Good Solution for Non-Pressurized Tank Car Fleets



MIDLAND COMPLETES ITS GENERAL PURPOSE PACKAGE OF TANK CAR COMPONENTS AND FITTINGS, MAKING IT A LEADING ONE-STOP SOURCE FOR VALVES, GAGING DEVICES AND ANCILLARY ACCESSORIES

By Troy Scarrow

Introduction

By definition, the word “general” – “not specialized or limited in range” – seems, well, a bit general. In the railroad industry, however, it is anything but. The commonly used term “general purpose railcar” covers a whole array of applications in which railcars are used to transport vast amounts of raw materials and finished commodities across the country.

The true vastness of the railcar-delivery system in North America is spelled out in the *North American Freight Railcar Review 2020* from Railinc, an aggregator of railroad industry data and wholly owned subsidiary of the Association of American Railroads (AAR). According to the report, there were 2,132,298 pieces of railcar equipment (including locomotives) in service at the conclusion of 2019, up 1.2% over year-end 2018. Within the revenue-earning fleet – consisting of covered hoppers, hoppers, tank cars, box cars, flat cars and gondolas – half of the equipment total consisted of covered hoppers (29%) and tank cars (21%).

Overall, in 2019, the revenue-earning fleet experienced an increase of 8,000 units to 1.66 million total, up 0.5% from 2018. Tank cars drove that growth with a 3% increase, while covered hoppers (2.3%) and flat cars (0.4%) accounted for the remainder of the growth. Additionally, railcar capacities continue to increase with railcars with a gross rail load (GRL) of 286,000 pounds making up most of the new additions over the past 25 years.

Of the top 10 equipment types within the revenue-earning fleet, various classes of non-pressurized general purpose tank cars occupy four of those spots (Nos. 6, 7, 9 and 10) and account for approximately 206,000 units in the revenue-earning fleet. Various configurations of covered hoppers and gondolas encompass the top five railcar types currently in service, and these are used to transport non-liquid commodities such as grain/fertilizer, plastics, sand/cement and coal. The final spot (No. 8 in the rankings) are pressurized tank cars.

This means that despite their rather generic name, general purpose railcars are, and will continue to be, a significant link in the North American railroad supply chain. That's a whole lot of railcars that must be outfitted properly in order to ensure that they are able to perform their tasks safely, efficiently and cost-effectively. For our purposes, this white paper will focus on the needs of the 206,000-unit non-pressurized tank car segment and help illustrate how acquiring general purpose railcar components – typically valves, gaging devices and other ancillary equipment – from a single-source supplier can overcome the challenges in developing the most effective and reliable fleet imaginable.

The Challenge

The overriding challenge that confronts railroad operators is a daily battle with time, or namely the amount of it that is needed to get the train from Point A to Point B in the production and supply chain. The most successful railroads are those that are able to complete deliveries in the quickest, and safest, time possible. Therefore, railcars that are idled because of malperforming components are a hindrance to the railroad's bottom line. While breakdowns can be unavoidable, when they do occur, the quickest repairs can be performed by a shop that has components from one supplier on hand, which removes the time and cost expenses that can be incurred when dealing with multiple parts suppliers and differing inventory needs and levels.

The second basic challenge is having a tank car fleet that is capable of handling the commodities that need to be transported. Simply put, no two payloads are alike. Just a cursory look at the number of different products that are transported by non-pressurized tank cars reveals a dizzying array, from crude oil, gasoline, acids and caustics to molten sulfur, asphalt, glycol, food-grade vegetable oil and tallow.

The first consideration, after keeping in mind that even non-pressurized tank cars will have an internal pressure level usually between 75 and 160 psi (5.2 to 11 bar) when fully loaded, is the viscosity of the transported liquid. Because of that distinction, there are two configuration styles of general purpose tank cars:

- **Uninsulated:** These cars are used with liquids – think gasoline, ethanol and light crude oils – that can be shipped as-is with the ambient atmospheric temperature not affecting their viscosity. This means that the biggest challenge for these types of tank cars is getting the payload to the final destination as quickly as possible.

- **Insulated:** Things get a little trickier with substances like asphalt, molten sulfur and some vegetable oils that tend to thicken or harden as the ambient temperature decreases. For the transport of these commodities, insulated tank cars are equipped with a heating coil through which steam is run in order to keep the payload at a temperature that prevents it from hardening or thickening. Again, time can be a culprit here if a load of asphalt in an uninsulated tank car is delayed. In that case, it may harden, which will require the operator to steam the car, which can take 8 to 12 hours to get the asphalt back to its intended level of viscosity.

In larger delivery operations, some tank cars are purposed for use with multiple products. In this case, they may need to be steam cleaned after that load of glycol has been delivered, but before it can be loaded with vegetable oil.

In all of these scenarios, the performance of the non-pressurized tank car will be optimized if it is outfitted with components that are compatible with the payload and, again, if those components come from the same highly respected manufacturer and supplier, the delivery process can reach even loftier heights of efficiency, reliability and safety.

The Solution

For more than 60 years, Midland, Skokie, IL, an OPW company, has been building and sustaining a reputation as a premier designer, manufacturer and supplier of tank car fittings and components that protect workers, equipment and the environment. This commitment has led to the recent completion of its "General Purpose Package" of non-pressurized tank car components, which effectively makes the company a one-stop source for all critical tank car fittings. These products have been designed to meet the challenging shipping requirements of a demanding industry while satisfying all local, state and federal regulations, including those of the AAR, that govern railroad transport.

Midland's complete General Purpose Package consists of the following products:

- **Top Transfer Ball Valves:** Midland's newest product, and the one that completes the General Purpose Package portfolio, was introduced to the market in 2020. Available in carbon-steel A-7200/A-7300 and stainless-steel A-7240/A-7340 models, these valves feature a combination flanged and threaded design with the flanged end connected to the tank car and the NPT threaded end allowing the connection of an adaptor

THE SOLUTION



A-7200/A-7300
Top Transfer Valve



A-210/A-212
Vacuum Relief Valves



B-612
Gauging
Device



A-522 Ball Valve



A-19075 Smart-Flow
Pressure Relief Valve

directly to the valve. All models have a full-bore design that produces unrestricted flow rates for optimized unloading times. They are available in 2" and 3" sizes with virgin PTFE seals. The 6" and 7.5" flange sizes also allow for direct replacement of competitive valve models.

- **A-522 Ball Valve:** This versatile ball valve is available in standard and steam-jacketed designs with both carbon steel and stainless steel materials of construction. The compact design fits all current API adaptor and vapor-fitting styles, while the stem's live-loaded and adjustable packing reduces the potential that leaks will occur during unloading. The PTFE and TFM seal options are compatible with a wide range of commodities and are capable of operating in low temperatures with low torques experienced across the complete temperature range. The unrestricted port opening maximizes flow rates and requires only a quarter-turn to fully open and close.
- **Bottom Outlet Ball/Plug Valves:** For those applications that require the bottom unloading of the tank car, Midland offers two styles of bottom outlet valves. Ball-style BOVs can accommodate a full 4" port opening for unrestricted flow and open and close with just a quarter-turn required. PTFE seats are compatible with most commodities and special seat designs are available for use with highly viscous products like molten sulfur and asphalt. The plug-style BOVs are spring-loaded to ensure they remain closed in the event of an accident and their low-profile design prevents shearing off. Their triple-seal design provides redundant sealing capability and extends service life with a cavity-free configuration that prevents entrapment or isolation of the commodity inside the valve

body. A wide variety of O-ring materials ensures universal compatibility with most commodities, including acidic and caustic chemicals and fuels.

- **Smart-Flow® (A-19075) External Pressure Relief Valve:** The innovative design of the Smart-Flow PRV places all of its components, which are constructed of stainless steel, outside of the tank car's vapor space and wetted area, which protects it from corrosion and premature aging. The Smart-Flow's design is also critical in mitigating the effects of a pool fire in case of a rollover incident when transporting flammable or explosive materials. The valve has a 75-psig repeatable set-to-discharge rating with flows up to 10,730 standard cubic feet per minute (scfm). This allows it to minimize the amount of product released, resulting in better performance in a 100-minute pool fire than a higher-flow PRV. The Smart-Flow's low profile (less than 9") also reduces the chance that it will shear off in a rollover accident. Tongue-and-groove and flat-face connection versions are available, with the 6.5" by 10.25" bolt circle enabling it to be retrofitted into existing PRV setups.
- **Vacuum Relief Valves:** These valves are available in A-210 (flanged) and A-212 (threaded) models. They both have a flat disc that has been specifically designed as an enhancement that keeps the seal and eliminates the issue of a missing or rolled O-ring that can happen with the traditional style of VRV with a groove on the stem. This design enhancement also prevents the escape of vapors that can occur in VRVs that use an O-ring seal. The VRV's stem is guided in two places, which reduces accidental cycling, or "burping," if vibration or impact

occurs during transport while giving it a more consistent seal that decreases the chance that pressure leaks will occur. A tamper-evident seal wire on the top screws lets the operator know if the valve has been tampered with. Optional mesh screens can be positioned at the top of the VRV's opening to the atmosphere, while baffles can be placed at the bottom; both are designed to prevent the transported commodity from splashing into the valve.

- **B-612 Gaging Device:** Featuring a lightweight float and guide rod that can accommodate a wide specific-gravity range for tank cars used to transport changing commodities. Stainless-steel construction improves durability and corrosion resistance for longer service life and less downtime. The alternate 3.25" bolt circle reduces space requirements on the pressure plate within the manway and the unit's serial number is located in three spots for user-friendly and time-sensitive identification.

Midland also offers a number of accessories that can be used in conjunction with the General Purpose Package components to further improve operations. Most valve types can be fitted with special saddles that will allow them to seamlessly mate up with competitor's equipment. Breather vents and rupture discs allow air to enter and exit the tank car and open in the case the car ever becomes overpressurized. The Tanktite® detachable handle prevents

BOVs from accidentally opening, even in emergencies, while storing safely, securely and within easy reach underneath the tank car. Midland also offers lift-assist springs for manway covers that make them easier and less stressful to open, which improves the health and safety of the technician. Finally, most Midland valves are compatible for use with the Kamvalok® and Drylok™ Dry Disconnect product lines from OPW Engineered Systems, a fellow member of OPW's Fluid Transfer Solutions product group. These dry disconnects virtually eliminate product leaks during the disconnection of transfer hoses and loading arms.

Conclusion

Saying something is "general" may have acquired a meaning of being mundane, but in the world of railroad transportation, the general purpose non-pressurized tank car is a key player in the never-ending symphony of end product and raw material supply. The best tank-car fleets are now the ones that can be outfitted with components that originate from a single supplier, and Midland has positioned itself to be a top choice in the field with its filled-out General Purpose Package, the components of which will help railroads optimize the efficiency, reliability and safety of their product-transport operations.

About the Author:

Troy Scarrow is a Regional Sales Manager for Midland Manufacturing, Skokie, IL, and can be reached at troy.scarrow@opwglobal.com or (312) 286-0783. Midland is delivering what's next through innovations designed to enhance safety, reliability, efficiency and business performance for the railcar industry. Midland specializes in products used on pressure and general purpose rail tank cars, chemical cargo tanks and ISO containers for the safe handling of toxic materials, chemicals and food products; bottom and top loading/unloading valves, pressure relief valves, level gage devices and monitoring equipment. Midland is part of OPW, a leading equipment manufacturer in the retail fueling, fluid-handling and vehicle-wash industries. OPW has manufacturing operations in North America, Europe, Latin America and Asia Pacific, with sales offices around the world. OPW is part of Dover Corporation. To learn more about how Midland is delivering what's next in the railcar industry, visit midlandmfg.com.