RAILWAY SUPPLY INSTITUTE

Support, Connection, Advocacy

RSI Quality Newsletter

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A MESSAGE FROM THE PRESEIDENT

Submitted by Mike O'Malley – RSI

The RSI team is deeply saddened to announce the passing of our former Director of Safety & Regulatory Affairs, Randy Thomure.

A more than 40-year veteran of the rail industry, Randy joined the RSI team in the fall of 2018 to support the work of our American Railcar Inc., Equipment Leasing and Quality Assurance committees. During Randy's brief but impactful tenure, the association made significant strides as a leader in the development of railcar technical standards, research, and in the advancement of policies and regulations related to safety and operational issues. Randy partnered closely with the Federal Railroad Administration (FRA), Association of American Railroads (AAR), and RSI member companies to identify solutions that made sense and moved our industry forward. He also was a longstanding Board member and leader of the Railcar Technical Services Association, which provides educational programming on railcar maintenance best practices and trends.

Randy began his career with the Missouri Pacific Railroad and went on to hold senior positions within the railway supply industry throughout his career at firms like The Andersons, Sapa Extrusions, TrinityRail Group, U.S. Leasing, and Itel Rail. Before joining RSI, Randy also founded a consulting company called Rail Asset Advisors, LLC.

His knowledge and expertise of the rail industry were incredibly valuable to our organization, and his passing is a significant loss for the industry and all of the RSI members and staff. In lieu of flowers, his family has asked that any donations go toward the Mesothelioma Applied Research Foundation.

CPC-1362: THE ROAD TO FACILITY CERTIFICATION IS PAVED WITH GOOD INTENTIONS

Submitted by Joshua Adams – Union Tank Car Company

On April 14, 2020 the Association of American Railroads (AAR) released a Causality Prevention Circular (CPC) 1362 outlining a new revision to Appendix B of the AAR Manual of Standards and Recommended Practices (MSRP), Section C-III Specification of Tank Cars (M-1002) that reintroduced certain facility certifications for closures and fittings on a voluntary basis. This article intends to provide background and clarity on the substantive changes and their impact.

It would be difficult if not impossible to address the latest April 2020 revision of Appendix B and CPC-1362 without first reviewing the events that have transpired prior to the revision and CPC (for a comprehensive overview, readers can also review the RSI Volume 1, 1st Quarter 2020 article titled "*Evolution of the Tank Car Technical Facility*"). In 2018 Appendix B was entirely revamped and emerged with an array of new certification requirements to be effective January 1, 2020 and was received by the industry steeped in controversy. Among the controversial new requirements, two stood out as particularly impactful to the industry as a whole: (1) suppliers of closures and fittings and **all** subcontracted entities in the manufacturing process would now be required to hold facility certification, likely causing a large segment of suppliers to opt out of AAR facility certification, reducing the nation's tank car supply chain; and, (2) shipping facilities would now have to carry facility certification to perform the pre-trip inspections and minor repairs required by federal regulations where a facility certification was not previously required.

In an October 2019 response to industry inquiry, the Pipeline and Hazardous Materials Safety Administration (PHMSA) clarified in a letter to the Railway Supply Institute (RSI) that (1) tank car component manufacturers and (2) facilities that conduct pre-trip inspections and/or minor repairs do not meet the definition of a "tank car facility" and therefore are not required to maintain facility certification. In response to this revised guidance, the December 2019 Appendix B revision referenced in CPC-1354 eliminated the requirement for the facility certifications C4a (Assemble and Qualification of Tank Car Service Equipment), C4m (Manufacture and Qualification of Tank Car Service Equipment, and C5 (Maintenance and Qualification of Tank Car Service Equipment) pertaining specifically to closures and fittings.

The latest April 2020 Appendix B revision outlined in CPC-1362 adds yet another chapter in the facility certification saga. CPC-1362 acknowledges the previous December 2019 elimination of the requirement for facility certification regarding closures and fittings for C4a, C4m, and C5 but now offers a voluntary facility certification for those activities. There is however one not so insignificant caveat to consider for those who elect to volunteer, as outlined in CPC-1362 "If a facility elects to obtain and maintain certification on a voluntary basis, the requirements of Appendix B apply as if mandatory".

Prescriptive regulations, albeit well intentioned, become problematic when one size fits all requirements are applied to complex environments. The reasons why a facility may or may not choose to voluntarily certify can be as diverse as the types of activities performed and the facilities themselves. For example, a facility may have already allocated the funds

Have an Idea for an Article?

Please submit your drafts to Donna Jacobi at **djacobi@amstedrail.com** or Gary Alderson at **alderson@alltranstek.com.**

Intersted in Joining RSI QAC?

Contact Lee Verhey at **verhey@rsiweb.org**.

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and resources to obtain a new facility certification per the 2018 Appendix B and would like to stay the course or may simply anticipate a surge in customers that would be more likely to conduct business with a certified facility over a non-certified facility. On the other hand, a facility may believe that a certification does not provide any additional value and that the cost of certification and compliance audits outweigh the benefits of certification, or does not believe the data warrants such a certification. In either case, for or against certification, the facilities would not be wrong.

To volunteer, or not to volunteer - that is the question and a question that can only be answered by an informed facility. The following summary of facts surrounding C4a, C4m, and C5 facility certifications for closures and fittings may help in the decision-making process:

- Facility certification is not mandatory
- Facilities may choose to obtain a voluntary certification
- If a facility volunteers for certification, all aspects of Appendix B become mandatory e.g. recertification audits, audit demonstrations, compliance audits, etc.
- Certified facilities and non-certified facilities possess identical regulatory capabilities
- The absence of a certification is not an indictment of poor technical performance

In our fast-paced industry, this is one of the rare occasions where a facility certification decision can be made based on specific needs or perspective and does not need to be made in haste.

Q&A WITH RSI QUALITY ASSURANCE COMMITTEE

Q: What is the NTSB?

A: In 1967, Congress consolidated all transportation agencies into a new U.S. Department of Transportation (DOT) and established the National Transportation Safety Board (NTSB) as an independent agency placed within the DOT for administrative purposes. In creating the NTSB, Congress envisioned that a single organization with a clearly defined mission could more effectively promote a higher level of safety in the transportation system than the individual modal agencies working separately. Since 1967, the NTSB has investigated accidents in the aviation, highway, marine, pipeline, and railroad modes, as well as accidents related to the transportation of hazardous materials.

In 1974, Congress reestablished the NTSB as a completely separate entity, outside the DOT, reasoning that "...No federal agency can properly perform such (investigatory) functions unless it is totally separate and independent from any other ... agency of the United States." Because the DOT has broad operational and regulatory responsibilities that affect the safety, adequacy, and efficiency of the transportation system, and transportation accidents may suggest deficiencies in that system, the NTSB's independence was deemed necessary for proper oversight. The NTSB, which has no authority to regulate, fund, or be directly involved in the operation of any mode of transportation, conducts investigations and makes recommendations from an objective viewpoint. (Note: the previous edition of the newsletter incorrectly listed the NTSB and the National Railroad Passenger Corporation as regulatory entities.)

Q: What is the STB?

A: The STB is the Surface Transportation Safety Board. It is the industry's economic regulator primarily (including RR service) and is an independent Federal agency. The STB was placed ("administratively aligned") within the DOT in 1996 as part of the Interstate Commerce Commission (ICC) sunset act. The ICC was established by Congress in 1887. On December 18, 2015 the STB was formally removed from the DOT to preserve its independence.

RSI/CMA RAIL EXPO AND TECHNICAL CONFERENCE CANCELLED

In light of the ongoing public health risks surrounding in person events and the safety of travel as a result of COVID-19, the Railway Supply Institute (RSI) has decided to cancel the 2020 RSI Expo & Education Conference scheduled for September 9-11 in Chicago, Illinois. In lieu of the event, RSI is exploring the possibility of holding a limited number of education sessions through a virtual platform and will provide additional information in the coming weeks.

AAR TASK FORCE FOR THE VOLUMETRIC DETERMINATION OF TANK CARS

Submitted by Gary Alderson – AllTranstek, LLC, AAR Task Force Member;
Contributing editors: Brian Bartley, Mike Untermeyer- AllTranstek, LLC and Cody Aldredge – Trinity Industries

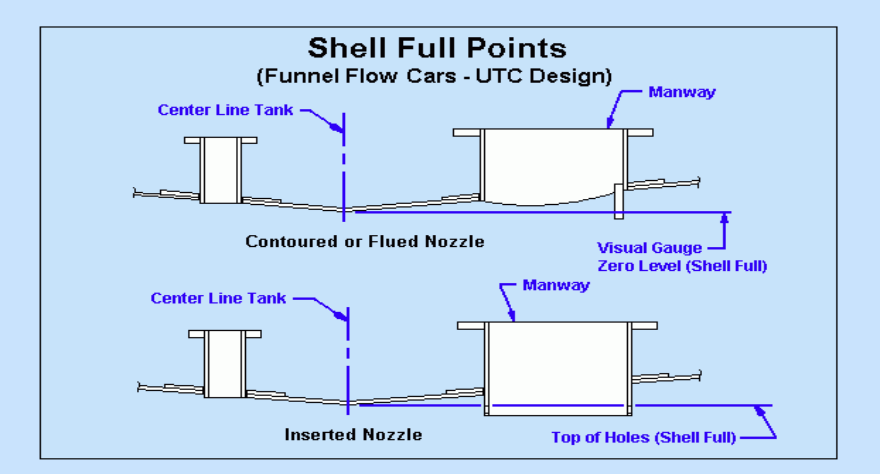
Based on some recent meetings with our American Petroleum Institute (API) 2554 /AAR Task Force, I wanted to discuss how tank cars are measured or gauged to determine their volume capacity and how gauge tables are used to load tank cars with different commodities. API Standard 2554, Volumetric Determination of Tank Cars, has not been revised since 1964. The AAR Task Force and API members have been working together to revise the standard and add newer technologies, so the standard meets current industry practice. The new technologies being considered by API will allow for a much easier method to determine volume of the tank car tank and assigning a gauge table compared to how it is performed today.

I would like to provide some background on tank cars in this article to help those who deal with loading tank cars at shipper facilities and those receiving and unloading tank cars.

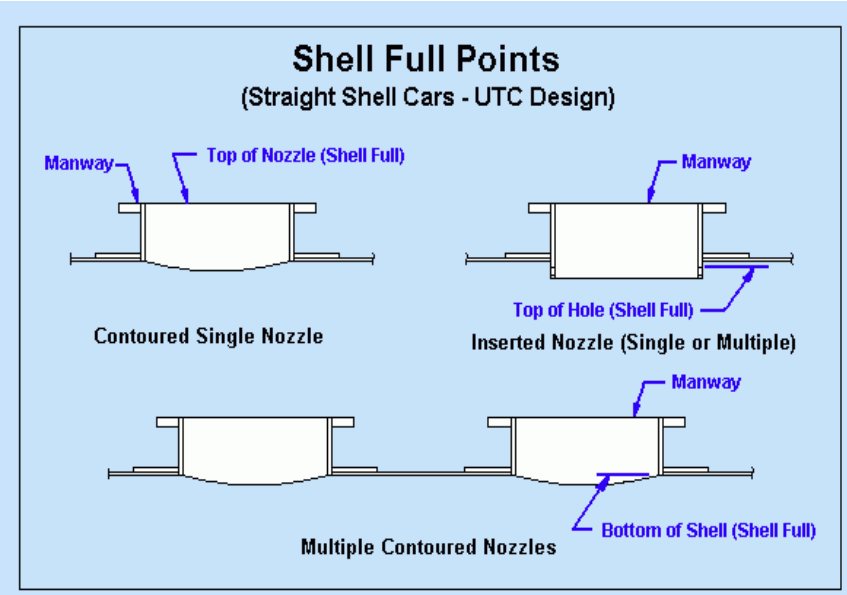
Tank car shell rings that construct the tank portion of a railroad tank car are manufactured to tolerances of plus or minus 1/16". The steel plates are burned to size, and the edge bevels are created on CNC (computer numerical control) plasma machines. The plates are then rolled to the required diameter and the longitudinal seam is welded using submerged arc welding. The rolled plates or "shell rings" are then fit together so the root opening for the weld process is very small (0 to 1/16"). Sections of these rolled plates are welded together with submerged arc welding and pre-cut holes burned by the CNC plasma are used to install tank nozzles and flanges for fittings. Pressed heads (either hot pressed, cold pressed, or spun) are also fitted and welded to the tank car tank. After all welding is completed, the tank car welds are radiographed (x-ray) or ultrasonically inspected. After all submerged arc weld inspection is acceptable, the tank car tank is fitted with reinforcing pads and the underframe is attached by welding. Tank Car Tank manufacturing tolerances have been continually improved and driven by the Quality Assurance Program requirements in 49 CFR 179.7. Technology improvements are enhancing the manufacturing process capability of the Tank Car geometrical tolerances

within the industry. Some examples include: Advancements in CAD design, CNC plasmas and plate rolls, automated welding equipment with active feedback monitoring variables, three-dimension scanning to verify tooling for parts, and the progression of digital based systems that provide analytical feedback.

After the underframe is attached, the entire tank car minus the trucks, is placed in a large furnace for Post Weld Heat Treatment. This process reduces the stresses in the tank caused by welding. After the required cool down period and movement through the process, the tank is later filled with water to determine the volume capacity of the tank, which can be completed by the metering technique, or the water gauging technique. Also, some companies use what is known as the strapping technique for shell full capacity and that involves measuring the diameter and length to calculate the volume capacity, and the tank is later filled with water to perform the required hydrostatic testing.



During the time that the tank car tank is being filled with water using the metering or water gauge method, the tank car tank volume can be determined by taking measurements at increasing levels while filling the tank car tank to the maximum level, or what is known as the "shell full" capacity. The metering method uses a calibrated electronic meter to measure the amount of water filling the tank. The water gauge method uses overhead calibrated tanks with known capacities and then series of dumps of the tanks are used to fill the tank. This is the part of the manufacturing process where the gauge table is calculated for the individual tank car, or for a series of tank cars. Based on liquid level measurements or by the strapping technique, the tank car volume is accurately determined. If an existing gauge table is available it will be assigned to the tank car based on the capacity falling within plus or minus 0.1% of the maximum capacity listed on the gauge table. For example; if the maximum capacity on the table is 25,000 gallons, the shell full capacity of the tank car tank has to be within 24,975 to 25,025 gallons. If the shell full capacity of the tank car tank being gauged is out of that range, a new gauge table has to be calculated. The new gauge table may be assigned to the specific car, or to a series of cars built under the same group. After the volume capacity is determined it is permanently steel stamped on the outside of each head, and the tank car tank is hydrotested and then continues on for jacket application, painting, etc.



Sometimes we hear of tank cars that are loaded with a commodity at the shipping facility using a gauge table assigned to the tank car by the car owner, and when the tank car is unloaded the same volume is not received that is stated on the bill of lading.

The differences in amount of commodity received could be caused by an inaccurate gauge table. If this is determined to be the root cause, the tank car can be cleaned and sent to a facility that can gauge the water capacity to see if a new gauge table is required and the car owner and builder should be contacted for questions on gauge table variation so they can correct their process as needed to prevent recurrence.

One other factor that could cause the difference in commodity, is the shipping facility did not consider and record the temperature at the time of loading. The temperature is recorded at time of loading for certain commodities because of the variation of density of the commodity at different temperatures. For example; gasoline has a temperature vs. density variation of 2.5% between 50F and 80F. Depending on how the shipping facility measures the level in the tank car, either by a fixed gauge such as a gauging device with a gauge rod with the specific gravity stamped on it, or by weighing the tank car after loading, a variation can occur based on temperature at time of loading vs time of unloading.

The federal regulations also describe how tank cars are loaded based on temperature and to provide outage to prevent cars from being overloaded. 49 CFR 173.24(b) should be followed when loading liquid into tank cars. The maximum temperature ranges are stated in the regulation along with maximum filling capacity and outage (how much commodity is left out of the tank car tank) to prevent spillage from the manway during transit due to sloshing and expansion caused by temperature variation.

49 CFR 173.314 (c) should be followed when loading compressed gases in tank cars. Compressed gases are loaded based on a ratio of their weight compared to water capacity of the tank car tank.

49 CFR 173.31 should be followed for inspecting the tank car prior to shipping.

Tank car volume capacity does not change unless there is a significant amount of interior metal loss due to corrosion. Tank cars receive regular maintenance and inspection as required by DOT regulations and AAR requirements. Because the tank car is inspected during shopping events and maintenance or qualification events, the tank car tank would be bad ordered, and the tank car taken out of service for repairs before the gauge table would be affected by metal loss. For instance, a 1/8-inch metal loss on the entire interior of a 20,000-gallon tank car would increase the shell full capacity by 89 gallons. Another reason for changes to volume capacity would be caused by the tank car receiving damage that caused a large dent in the tank car tank. This type of damage can occur, and the car owner or fleet manager should be contacted immediately, the car should not be loaded if damage is present (refer to Pamphlet 34 and 49 CFR 173.31). Another fact to consider is manufacturers of tank cars receive specifications from the company that is having tank cars built and that information has to include the product density for the design of the tank car for consideration of the light weight and gross rail limit of the tank car. The light weight of the tank car is the total weight of the tank car, and the gross rail limit is the total weight of the tank car on the rail when filled with commodity to the shell full capacity. The maximum gross rail limit is determined by commodity, but in no instance can be above 286,000 pounds.

Some points to consider when using gauge tables for tank cars:

1. How does the loading facility measure the volume of the commodity they load into the tank car?
2. Are they using a fixed measurement such as a Gauging Device? Does the device have the correct specific gravity stated on the gauge rod for the commodity? Has the gauging device been verified recently to see if the magnets have weakened? A predetermined weight can be placed on top of the gauge rod to determine if the magnets in the floating ball or on the end of the gauge rod need replaced. If the gauging device is not functioning properly, it will not measure the liquid level properly.

3. Are they measuring the liquid level using a graduated rod or tape measure at the manway, if it is within company safety guidelines? If so, do they have drawings to find the lowest point at the bottom of the tank where the gauge table was calculated from? Some tank cars have sloping bottoms (tip tank, funnel flow) to allow for draining of the commodity from the bottom outlet. Other tanks have no slope and are called straight barrel, or straight tanks. The manway is not centered over the lowest point of the tank on most tank cars and the remaining distance to the lowest point is not obtainable with a tape measure or graduated rod.
4. Is the loading facility loading by weight? Do they adjust the volume based on the weight of the commodity vs the weight of water (water weighs 8.34 pounds per gallon)? All gauge tables are based on water capacity only.
5. Is the unloading facility using the same method to measure the received volume? Fixed gauging device, tape measure, weighing?
6. Are both facilities considering the temperature vs. density correction factors when loading and unloading?
7. Is 49 CFR 173.24(b) being followed during loading (outage and filling limits)?
8. Is 49 CFR 173.314 c being followed during loading and unloading of tank cars in compressed gas service?
9. Is the correct gauge table being used?
10. Is the visual outage scale being read correctly?

Based on my experience of participating on the API 2554 Task Force, there can be issues and inaccuracies concerning the use of gauge tables. Hopefully this article provides you with some information you were not aware of about gauge tables and tank cars, and it prompts you to ask questions if you find variations when using the outage and innage table assigned to the tank car(s).

USEFUL LINKS

Railway Supply Institute

RSI QAC & Previous Newsletters

RSI Tank Car Resource Center

Registry of M-1003 Certified Companies

M-1003 Frequently Asked Questions

American Society for Quality - Training

AAR M-1003 Certification on-line Application

AAR M1003, Section J Specification for Quality Assurance

AAR Training Schedule

AAR Circulars

MSRP Publication Current Revision Status

AAR Online Material Nonconformance Reporting System (Chapter 7)

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