Molten Sulphur Rail Tank Car Loading and Unloading Operations

Leading Practices in Industry

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Table of Contents

Executive Summary 1

1.0 Introduction 3
1.1 Study Overview 4
1.2 Federal Railroad Administration Study Overview 4
1.3 Sulphur Properties 6

2.0 Overview of Loading/Unloading Safety Precautions when Handling Molten Sulphur Rail Tank Cars 7
2.1 General Overview 8
2.2 Safe Operations 8
2.3 Emergency Considerations 10
2.4 Specialized Equipment Considerations 10

3.0 Loading Molten Sulphur into a Rail Tank Car 13
3.1 Open Dome Lid (Venting) 14
3.2 Loading a Rail Car 14

4.0 Unloading Molten Sulphur from a Rail Tank Car 17
4.1 Open Dome Lid (Venting) 18
4.2 Steam Rail Car 19
4.3 Unload Rail Tank Car 19
4.4 Secure from Unloading Operation 20

5.0 Observations 21
5.1 Alternatives for Loading 22
5.2 Alternatives for Unloading 22
5.3 Potential Equipment Improvements 22

6.0 References 24

7.0 Acronyms 25

Appendix A – Molten Sulphur Rail Tank Car Guidance 27

Appendix B – Association of American Railroads Pamphlet 34 31

Appendix C – Department of Transportation Safety Advisory Guidance 61

List of Figures

Figure 1: Formed Solid Sulphur at a Port Facility 2
Figure 2: Sulphur Molecule 4
Figure 3: Wind Sock as an Example of a Leading Practice 5
Figure 4: Sulphur Properties 6
Figure 5: Rail Tank Car Documentation 8
Figure 6: Safe Operations 8
Figure 7: H_2S Considerations 9
Figure 8: Emergency Evacuation 10
Figure 9: Eye Wash / Shower Stall 10
Figure 10: Safety Equipment 10
Figure 11: Personal Protective and Miscellaneous Safety Equipment 11
Figure 12: Open Dome Lid (Venting) 14
Figure 13: Loading a Rail Tank Car 14
Figure 14: Inspect Rail Tank Car 15
Figure 15: Manway Closure Procedure 16
Figure 16: Open Dome Lid 18
Figure 17: Unloading 20
Figure 18: Use of Bucket to Reduce Spillage 22
Figure 19: Maintain Paperwork 23

Executive Summary

The Sulphur Institute (TSI) has coordinated with the US Department of Transportation (DOT), Federal Railroad Administration (FRA) to observe, review, and provide a summary of procedures for loading and unloading molten sulphur rail tank cars and identify leading practices and opportunities for information sharing to enhance operations. These observations have led to development of this document on reducing potential for solid sulphur residue on the exterior of rail tank cars and ideas to improve practices and procedures for loading and unloading operations.

The Institute conducted a confidential survey of existing member company locations, including average number of molten sulphur rail tank cars loaded or unloaded per day, at several operating facilities. From this survey, sites were selected and solicited for peer review. Companies were contacted to assess their interest in participating in this study. Copies of loading and unloading procedures were requested and received from these and other interested companies.

Institute staff visited two loading, one transloading, and three unloading facilities to observe and collect data on possible origins of sulphur residue on the exterior of rail tank cars. These data have allowed TSI to identify potential causes, analyze associated trends, and provided an opportunity for industry to share practices and reduce molten sulphur residue on the exterior of rail tank cars.

The sulphur industry's goal is to load, transport, and unload sulphur in as safe and effective manner as possible. The Institute received an FRA grant to conduct a study and share leading practices for improving efficiency and safety of loading and unloading molten sulphur to and from rail tank cars.

This *Molten Sulphur Rail Tank Car Loading and Unloading Operations* study is an effort to share a variety of leading practices collected and aggregated from several facilities within the United States. This summary report provides the sulphur industry multiple examples of loading and unloading practices from which to select those most appropriate for their facility. In addition, this summary report provides general information about properties of sulphur and available references for safe handling.

The focus of this document is to address common issues faced when a worker is performing standard procedures around the manway when loading / unloading molten sulphur. Additional information regarding bottom outlet valves, as is necessary to the loading / unloading of the rail tank car is provided, however, is largely referenced in Section 6.0. Please refer to these resources for additional information.

This document references the following molten sulphur aspects:

- Study Overview and Sulphur Properties
- Safety Precautions

- Loading Practices
- Unloading Practices
- Observations Regarding Leading Practices

This study is neither a complete and comprehensive set of rail tank car loading and unloading methodologies, including worker safety procedures, nor meant to establish any standard or industry practice. Each particular location may require the use of additional, or different, precautions for loading and/or unloading operations to be performed safely, as each site may have unique attributes.

Figure 1: Formed Solid Sulphur at a Port Facility

1.0 Introduction

1.1 Study Overview

On December 3, 2002, the U.S. Department of Transportation (DOT), Research and Special Programs Administration (RSPA) published a Notice of Proposed Rulemaking (NPRM) in Federal Register, Vol. 67, No. 232 that proposed changes to Title 49 U.S. Code of Federal Regulations (CFR) §173.24 covering general requirements for non-bulk packages. Following RSPA's evaluation period, there were technical and substantive changes made to proposed wording in §173.24, paragraph (b)(4), published in Federal Register, Vol. 68, No. 147 Final Rule, on July 31, 2003 that affected bulk packages.

In 2004, bright yellow solid sulphur on jackets of molten sulphur rail tank cars attracted increased attention of Federal Railroad Administration (FRA) inspectors, who brought industry's attention to this new wording in 173.24(b)(4). As a result, The Sulphur Institute (TSI) implemented its "Action Plan for Spills on Molten Sulphur Tank Cars" to provide initial guidance for industry and to address Federal Railroad Administration (FRA) inspector's concerns. To further assist in this effort, TSI developed and widely distributed "Molten Sulphur Rail Tank Car Guidance Document," November 18, 2010, when adopted as a US Code of Federal Regulations reference by Final Rule published in Federal Register Vol. 78, No. 47 on Monday, March 11, 2013 (attached and labeled as Appendix A).

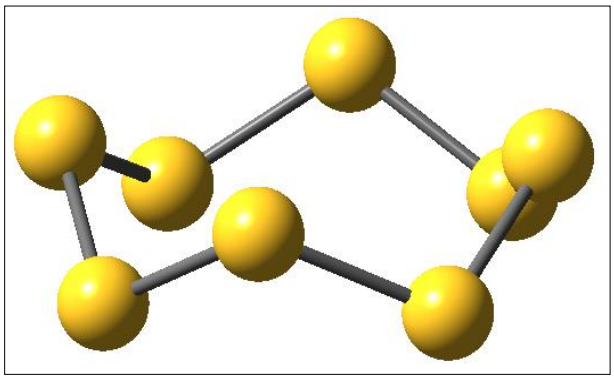


Figure 2: Sulphur Molecule

Current industry practices for molten sulphur rail tank car transportation, including loading and unloading, have been constantly improved over many years. Molten sulphur transportation was adversely affected by changes to 49 CFR 173.24(b)(4). When inspection personnel began cautioning shippers about possible violations for even small drops of formed, solid sulphur on exterior surfaces of rail tank cars, sulphur loading and unloading supervisory personnel requested assistance.

Rail tank cars used for shipping molten sulphur are designed, constructed, maintained, and carefully sealed, so that under normal conditions of transport, molten sulphur is contained inside the tank. Industry has made significant improvements in the past ten years to the molten sulphur rail tank car fleet. Industry efforts have been recognized by FRA in correspondence and noted in public forums.

1.2 Federal Railroad Administration Study Overview

The sulphur industry is dedicating significant assets to address solid sulphur residue on molten sulphur rail tank car jackets. This residue, which is not dangerous, attracts attention because of its bright yellow color on a black background. Since 2004, TSI has been working with industry to reduce occurrences of solid sulphur residue on molten sulphur rail tank cars through education, meetings, and regular communications.

Through observation of onsite facilities, TSI is providing suggestions for potential improvements to loading and unloading operations, along with other practical options, such as improving practices, equipment design, use of coverings, coatings, etc. Using a variety of existing practices, TSI has assembled potential improvements to a reasonable benchmark using a range of metrics most important to a cross section of users within our member organizations.

Figure 3: Wind Sock as an Example of a Leading Practice

In its analysis of leading practices regarding loading and unloading of molten sulphur to and from rail tank cars, TSI limited scope to procedures and practices on top of the rail tank car around the manway, the bottom-outlet valve, and general workplace awareness. The FRA outlined the following five tasks for TSI's study:

Task 1: Improve Loading Practices at Origin

- Identify and visit three typical existing loading locations to observe daily practices
- Investigate / evaluate equipment / methods used to load sulphur
- Identify possible improvements to operations

Task 2: Improve Unloading Practices at Destination

- Identify and visit three typical existing unloading locations to observe daily practices
- Investigate / evaluate equipment / methods used to unload sulphur
- Identify possible improvements to operations

Task 3: Data Collection

- Formulate suggested practices for Tasks 1 and 2
- Summarize non-accident related releases with rail transportation of sulphur
- Summarize general arrangements and fitting assemblies on molten sulphur rail tank cars
- Survey facilities for types of equipment used to load/unload sulphur
- Survey TSI members to develop general operating procedures and training needs for pre-shipment inspection and securement

Task 4: Resources for Development of Educational Materials

Task 5: Draft report with results

- Report review by FRA
- Final report with results
- Presentation of results to FRA and stakeholders

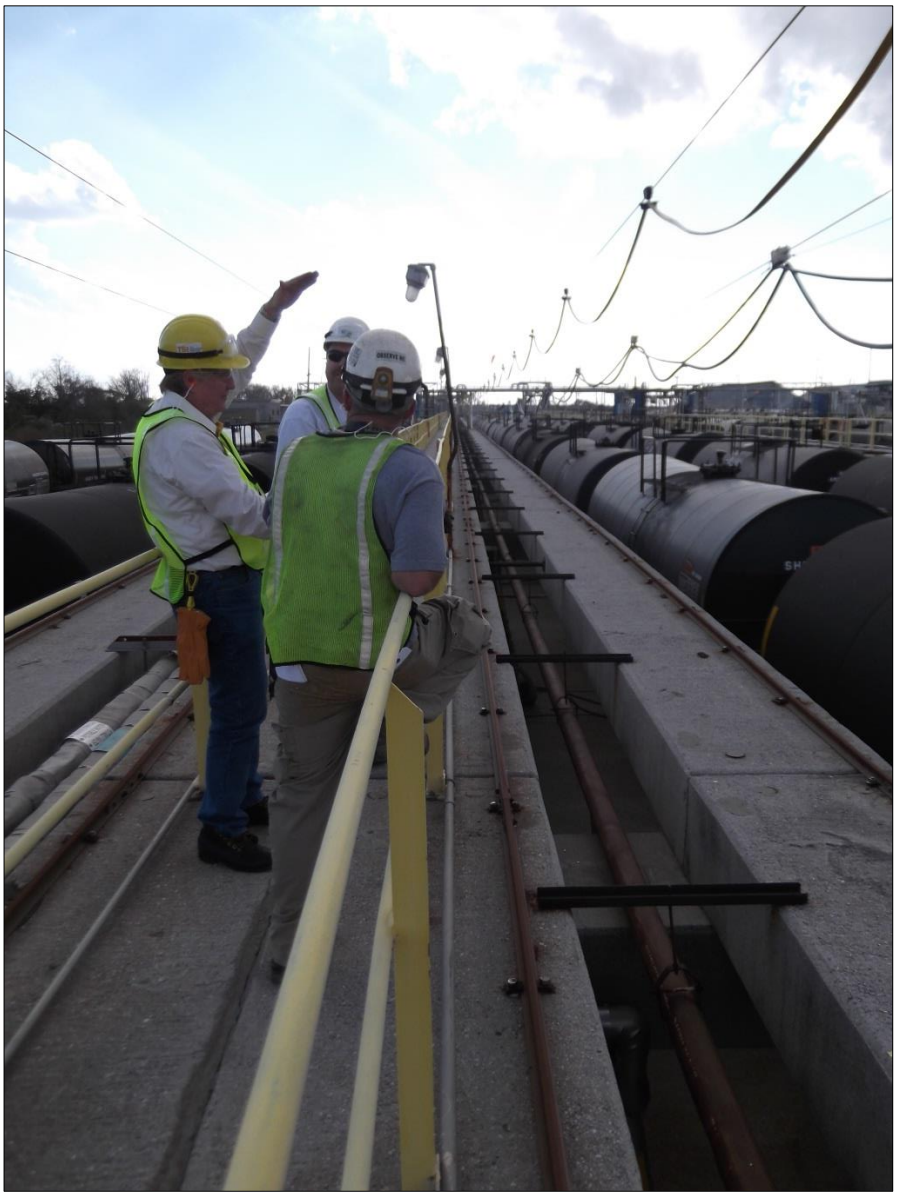
1.3 Sulphur Properties

Sulphur is an odorless, tasteless, bright yellow solid at ambient temperature. Typical sulphur properties are shown in the following table.

Figure 4: Sulphur Properties

Chemical Name: Sulphur
Chemical Formula: S_8 (orthorhombic form)
Physical State (at ambient temperature): Solid
CAS Number: 7704-34-9
Appearance: Solid - Yellow crystals, lumps, or formed shape; Liquid or molten - Yellow/Orange Viscous Liquid
Odor: Odorless (faint odor of rotten eggs if H_2S is present)
Vapor Pressure: 0mmHG at 280^{o}F (138^{o}C)
Solubility In Water: Insoluble
Specific Gravity: 2.07 @ 70^{o}F (21^{o}C); 1.83 @ 270^{o}F(132^{o}C)
Freezing/Melting Point: 235-246^{o}F (113-119^{o}C)
Flashpoint: 405^{o}F (207.2^{o}C)
Auto-ignition Temperature: 478-511^{o}F (248-266^{o}C)

2.0 Overview of Loading/Unloading Safety Precautions when Handling Molten Sulphur Rail Tank Cars



2.1 General Overview

Proper training, use of good practices, and following well-established procedures is desired for all personnel performing molten sulphur rail tank car loading or unloading at facilities. Whenever any of these elements is in question, trained personnel should have authority to shut down these, or any other related operation.

This section outlines, in general, steps to safely connect and disconnect steam, condensate, and compressed air lines, and sulphur transfer systems to rail tank cars, monitor melting of sulphur in rail tank cars, and conduct a transfer of molten sulphur from a rail tank car.

Operations Managers should ensure that personnel follow procedures when conducting molten sulphur transfers and that they are trained and equipped with necessary personal protective equipment (PPE) and tools to accomplish their work. In accordance with regulatory requirements, rail tank cars should be inspected upon arrival and prior to departure to ensure they are in compliance for transportation. Upon arrival, if there is a defect with the rail tank car, it should be sent directly to shop for repair. “Bad Order” documentation for rail tank cars should be maintained.

Figure 5: Rail Tank Car Documentation

2.2 Safe Operations

Typical work areas include steam generators, hot steam piping, condensate lines, air compressors, hand tools, and other equipment. Work areas under a rail tank car to open bottom outlets are in tight quarters whereas, work areas on top of a rail tank car to open manway covers are in more open, but at higher elevations. Personnel should wear appropriate PPE. Work areas should be kept as clean as possible to minimize tripping hazards and personnel should take proper precautions to prevent strains when working in awkward positions.

Figure 6: Safe Operations

Steam and condensate present two significant hazards: pressure and heat. Steam will normally be 30 – 70 psi and approximately 300°F (150°C). Condensate will normally be 0 – 70 psi and 200 – 300 °F (95 – 150°C). Unlike sulphur (where clothing provides a semi-insulating layer

from the hot liquid), steam and condensate may penetrate clothing and the hot, wet clothing may continue burning the skin. When there is potential for burns from these materials, protective clothing may include slicker suits over long sleeve shirts and non-cloth gloves.

The cloth provides insulation from the heat and the slicker suit prevents the hot water or steam from penetrating and saturating the cloth. Personnel should wear appropriate PPE to protect them from this hazard and heed warnings in established procedures.

Workers involved in loading/unloading molten sulphur should be aware that:

- Molten sulphur may cause irritation to eyes, skin and respiratory system; avoid liquid, mist and vapor contact

- Molten sulphur is stored and shipped hot, so thermal burns are a risk
  - Transfer of molten sulphur requires it to be heated; be aware of the risk of burns from contact

- Sulphur is essentially non-toxic either through ingestion, inhalation, skin or eye contact; however the following situations should be considered
  - May contain or release hydrogen sulfide (H_2S), a gas which can be fatal if inhaled at excessive concentrations
  - Individuals with known allergies to sulphites or sulphur medications may have allergic reactions to elemental sulphur
  - Avoid contact with eyes, especially contact lens wearers
  - Maintain adequate ventilation in loading and unloading areas

- Sulphur may burn if exposed to sparks, open flames, or oxidizing agents (including rust)

Figure 7: H_2S Considerations

- Sulphur should be stored separate from strong oxidizing agents, such as fluorine, chlorine, chlorates, nitrates (nitric acid), peroxides, liquid oxygen, permanganates, dichromates or the like

- Sulphur is corrosive to copper and copper alloys

- Be aware of other common workplace hazards
  - Heat stress
  - Slips/Trips/Falls

2.3 Emergency Considerations

- Should an operator working on the rail car become incapacitated, spotter (see Appendix B) should take the following actions:
  - Make sure to wear a respirator and PPE for rescue
  - Move operator away from rail car
  - Notify supervisor and request appropriate assistance
  - Personnel with potential for exposure to molten sulphur should have readily available access to eye wash / shower stalls

- In the event of a fire, wear full protective clothing and supplied air apparatus with full face respirator
  - Burning sulphur decomposes into sulphur dioxide (SO_2)
  - Notify supervisor immediately

Figure 8: Emergency Evacuation

Figure 9: Eye Wash / Shower Stall

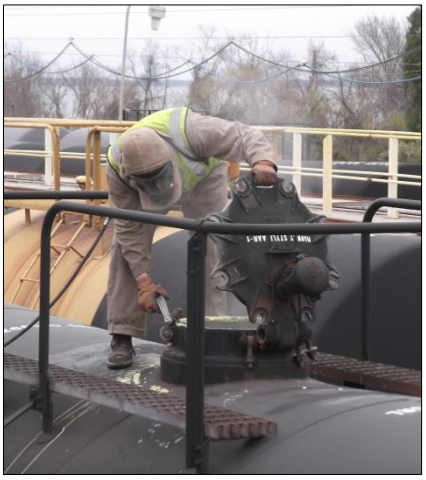


Figure 10: Safety Equipment

2.4 Specialized Equipment Considerations

- Management program should be in place to maintain clear procedures regarding approved usage of equipment

- Personal H_2S monitor should be worn at all times

- Positive pressure air supplied respirator when opening manway covers and bottom-outlet valves

- Regular H_2S training – certifications should be available

Figure 11: Personal Protective and Miscellaneous Safety Equipment

Following Are Suggested PPE Items
Hard Hat (ANSI Z89.1 Certified)
Safety Glasses (ANSI Z87.1 Certified)
Steel Toe Shoes (ANSI Z41.1 Certified)
Supplied Air Respirator (Required when opening rail tank car dome lid)
Appropriate Clothing (Long pants, long sleeve shirt, etc.)
Leather Gauntlet Gloves
Personal H_2S Monitor (alarm at 10 ppm)
Following Are Suggested Rail Tank Car Options: Consider on a Facility-by-Facility Basis
Bi-directional Derail (Engaged and locked-out)
Blue Flag (Raised)
Set Appropriate Number of Rail Car Handbrakes
Chock Appropriate Number of Rail Car Wheels

Additional information is available in Appendix C, “Safety Advisory Guidance: Heating Rail Tank Cars To Prepare Hazardous Material for Unloading or Transloading” published by the Pipeline and Hazardous Materials Safety Administration (PHMSA) in Federal Register Volume 78, Number 134 on Friday, July 12, 2013.

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3.0 Loading Molten Sulphur into a Rail Tank Car

3.1 Open Dome Lid (Venting)

Refer to Association of American Railroads Bureau of Explosives Pamphlet 34 for guidance on spotting rail tank cars, stencils, condition, and other general handling information (Attached as Appendix B). Advise owner of any problems with the tank car tank.

Figure 12: Open Dome Lid (Venting)

3.2 Loading a Rail Car

Prior to opening the dome lid:

- Following the proper spotting and securement of the rail car, inspect in accordance with appropriate government regulations
- Visually inspect tank car exterior for foreign matter or excessive product residue **(Note: Refer to Appendix A, TSI's Molten Sulphur Rail Tank Car Guidance document for additional information)**

Figure 13: Loading a Rail Tank Car

Check the following items for compliance:

- Confirm that tank car is for molten sulphur
- Confirm that stencils and marks are legible
- Check tank car for obvious signs of damage or leakage particularly around openings in the tank jacket
- Inspect gasket, nozzle, and eyebolts for wear or defects
- Inspect rupture disc and assure that pressure rating is compatible with stencil
- After ensuring safety, visually check bottom of tank car through open manway for any foreign matter

If tank car is not in compliance, follow company notification procedures

If tank car is acceptable, begin loading process
  - Insert and secure loading pipe to manway nozzle to prevent it from being displaced during loading
  - Calculate load quantity (consider capacity and determine outage)
  - Adjust load quantity for heel if present
  - Apply gauging device or other means to monitor product level

- During loading, bottom outlet valve must be closed
  - Check for any leakage during operation

- Monitor and control product loading to achieve desired outage limit and ensure car is not overloaded

- Prior to removing loading pipe from manway opening consider using a drip bucket or other means to capture any residual product from the loading pipe

After loading is complete:

- Move loading pipe/arm out of the way to allow for clear access to manway

- Inspect manway cover gasket and eyebolts and ensure they remain in good condition

- Check to ensure safety eye bolt is not wedged between manway cover and top of nozzle

- Visually confirm that gasket material is in full contact with entire nozzle circumference

Figure 14: Inspect Rail Tank Car

- Gradually tighten manway cover bolts in a diametrically opposite fashion until all are wrench-tight (Refer to Figure 15 for suggested bolt tightening patterns and torque values)

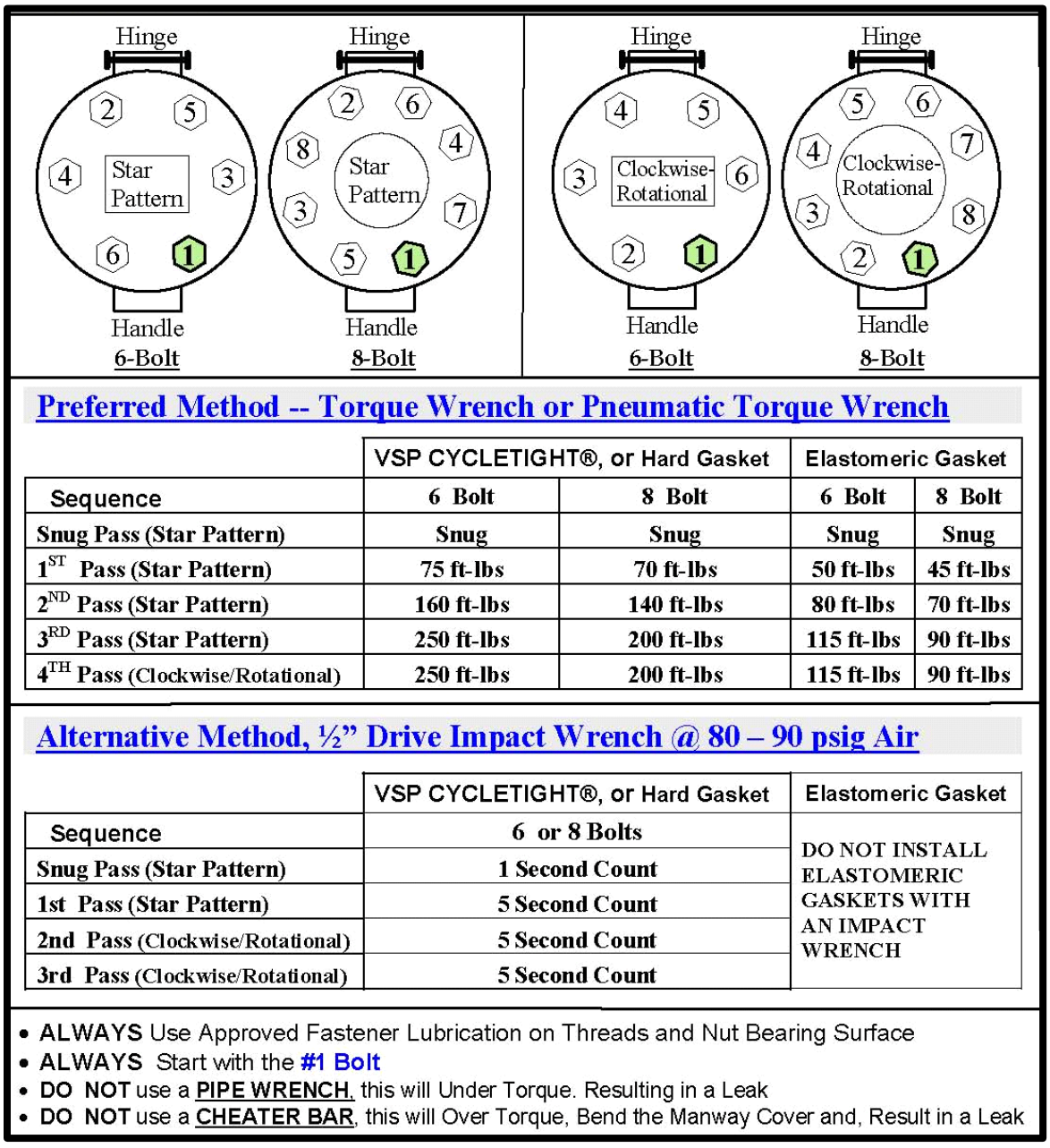
- Once loading is completed, and prior to shipping car, ensure that bottom outlet cap, manway cover, and any plugs are in place and secured wrench tight

- Close all fitting covers and install locking pins

- When required, install seals on fittings to protect load from vandalism or theft. Record seal numbers on bill of lading

- Inspect car to ensure it conform to appropriate government regulations usually found under *"Examination before shipping"*

Figure 15: Manway Closure Procedure[1]



Preferred Method -- Torque Wrench or Pneumatic Torque Wrench

	VSP CYCLETIGHT®, or Hard Gasket		Elastomeric Gasket	
Sequence	6 Bolt	8 Bolt	6 Bolt	8 Bolt
Snug Pass (Star Pattern)	Snug	Snug	Snug	Snug
1ST Pass (Star Pattern)	75 ft-lbs	70 ft-lbs	50 ft-lbs	45 ft-lbs
2ND Pass (Star Pattern)	160 ft-lbs	140 ft-lbs	80 ft-lbs	70 ft-lbs
3RD Pass (Star Pattern)	250 ft-lbs	200 ft-lbs	115 ft-lbs	90 ft-lbs
4TH Pass (Clockwise/Rotational)	250 ft-lbs	200 ft-lbs	115 ft-lbs	90 ft-lbs

Alternative Method, ½" Drive Impact Wrench @ 80 – 90 psig Air

	VSP CYCLETIGHT®, or Hard Gasket	Elastomeric Gasket
Sequence	6 or 8 Bolts	DO NOT INSTALL ELASTOMERIC GASKETS WITH AN IMPACT WRENCH
Snug Pass (Star Pattern)	1 Second Count	
1st Pass (Star Pattern)	5 Second Count	
2nd Pass (Clockwise/Rotational)	5 Second Count	
3rd Pass (Clockwise/Rotational)	5 Second Count	

- **ALWAYS** Use Approved Fastener Lubrication on Threads and Nut Bearing Surface
- **ALWAYS** Start with the **#1 Bolt**
- **DO NOT** use a **PIPE WRENCH**, this will Under Torque. Resulting in a Leak
- **DO NOT** use a **CHEATER BAR**, this will Over Torque, Bend the Manway Cover and, Result in a Leak

Note: Table shows suggested bolt tightening patterns and torque values

[1] *This table was prepared by Virginia Sealing Products, Inc., and is for information purposes only.*

4.0 Unloading Molten Sulphur from a Rail Tank Car

4.1 Open Dome Lid (Venting)

Refer to Association of American Railroads Bureau of Explosives Pamphlet 34 for guidance on spotting rail tank cars, stencils, condition, and other general handling information (Attached as Appendix B). Advise owner of any problems with the tank car tank.

Figure 16: Open Dome Lid

Prior to opening the dome:

- Determine wind direction and make sure all personnel in proximity stand upwind as indicated by wind socks
- Person opening dome should wear personnel protective equipment (PPE), which usually includes a positive pressure full face air supplied respirator with auxiliary air supply and personal H_2S monitor
- Ensure proper fit and operation of facemask and fresh air supply before proceeding
- Clear unloading area of all non-essential employees and contractors
- Anyone remaining in close proximity of a rail tank car while dome lids are being opened should consider not only atmospheric conditions but also and facility specifications for wearing proper protective equipment, including a personal H_2S monitor
- Make sure all personnel in proximity are aware that you are about to open dome lids
- Slowly loosen nuts on the dome lid starting at the hinge side, leaving nut on the safety bolt under the handle secure until all other nuts are loose, then slowly loosen nut on the safety bolt
- If H_2S monitor activates, stop unloading operation and evacuate to an area upwind of dome lid
    - Personnel in proximity should be wearing PPE and remain standing by to assist should the operator venting rail tank car need assistance
- Slowly open dome lid and if a crust of sulphur is discovered, break through it using a non-ferrous rod with caution as pressure may be trapped under this crust (This step is important to reduce potential for a release of molten sulphur when steaming car)

4.2 Steam Rail Car

Additional information is available in Appendix C, "Safety Advisory Guidance: Heating Rail Tank Cars To Prepare Hazardous Material for Unloading or Transloading" published by PHMSA in Federal Register Volume 78, Number 134 on Friday, July 12, 2013.

- Hook up steam inlet line and condensate outlet; remove bottom outlet cap; inspect gasket on the 90° fitting and replace if needed, and ensure bottom outlet valve is closed

- Secure bottom outlet cap out of the away from outlet nozzle to ensure that it does not contact the molten sulphur during unloading

- Slowly open steam valve to introduce steam to rail tank car. (This must be done slowly to avoid thermal shock to rail tank car coils)

- Blow out all residual condensate from steam coils until clean

- Steam fully until molten sulphur status is achieved. This process may take anywhere from 36-48 hours

- Fully open condensate return line and blow out all residual condensate from steam coils until clean

- Close steam valve supply valve

- Once rail tank car has discharged all steam and condensate, slowly remove hose from rail tank car being cautious not to expose yourself to hot condensate

- NOTE: Prior to discharge, the operator should commence the steam/condensate blow down and slowly remove steam hoses to reduce potential for personnel contact with hot condensate

4.3 Unload Rail Tank Car

- Check to ensure sulphur in rail tank car is completely liquefied prior to opening bottom outlet valve

- Check to assure steam hoses are removed from unloading area

- Place appropriate unloading connection or outlet funnel and secure to bottom outlet valve to assure that molten sulphur is directed into channel or molten sulphur pit

- Make sure bottom outlet cap is in a position that prevents molten sulphur splash during loading

- From a safe position, slowly rotate the bottom valve handle until product begins to flow. Confirm product is flowing steadily and being properly directed into outlet funnel and sulphur channel or connection and pit prior to fully opening valve handle

- Visually monitor unloading process to ensure product continues without restriction or obstructions

Figure 17: Unloading

- Ensure rail tank car is fully emptied (stops dripping) prior to closing bottom outlet valve

4.4 Secure from Unloading Operation

- Once rail tank car is completely empty, close the bottom outlet and secure handle in bracket and apply securement pin

- Unfasten and remove outlet product funnel

- Secure bottom outlet valve caps tool tight onto the rail tank car and be sure not to cross thread

- Close the dome lid, and tighten tool tight using the cross/torque method (refer to Figure 15)

- Complete post car inspection report

- Alert supervisor of any unusual operations or tank car abnormalities

5.0 Observations

5.1 Alternatives for Loading

Figure 18: Use of Bucket to Reduce Spillage

- Secure loading arm discharge pipe to manway nozzle to prevent it from being dislodged during loading
- Visual monitoring of molten sulphur level using gage rod at manway nozzle to prevent potential overfill situations
- When loading is near completion slowly reduce product flow to prevent "spitting" and eliminate sulphur spray on the jacket
- Consider waiting 5-10 minutes after loading is complete before moving loading arm away from nozzle to prevent dripping on jacket
- Consider attaching a bucket on the end of loading arm under nozzle after loading is complete to prevent dripping on jacket
- Consider using canvas tarp around manway nozzle to minimize sulphur residue on jacket

5.2 Alternatives for Unloading

- Ensure supplied breathing air is used by the operator when opening the manway and slowly venting the car while standing upwind
- Define safe distances from rail tank cars on a site-by-site basis while unloading to ensure that all personnel in proximity are aware when molten sulphur unloading is occurring
- Consider using canvas tarp around manway nozzle to minimize sulphur residue on jacket
- Consider securing bottom outlet cap away from bottom outlet nozzle to minimize splashing of product on the underside of rail tank car
- Consider using unloading funnels or cones to minimize splashing of product on the underside of rail tank car

5.3 Potential Equipment Improvements

- Maintain all checklists, paperwork, and bill of lading associated with rail tank car loading and unloading accessible at point of transfer

- Ensure emergency evacuation routes are clearly identified and signs are in place to direct personnel

- Consider alternatives to loading/unloading rack best suited to specific site capabilities/needs

- Direct forced air ventilation when opening the manway

- Consider torqueing procedure after 24 hours to ensure proper fit

Figure 19: Maintain Paperwork

6.0 References

- **Molten Sulphur Rail Tank Car Guidance (Appendix A)**
  - The Sulphur Institute, 2010

- **Association of American Railroads, Bureau of Explosives, Pamphlet 34, "Pamphlet 34 Recommended Methods for the Safe Loading and Unloading of Non-Pressure (General Service) and Pressure Tank Cars" (Appendix B)**
  - Association of American Railroads, Casualty Prevention Circular, CPC-1245, 2013

- **Safety Advisory Guidance: Heating Rail Tank Cars To Prepare Hazardous Material for Unloading or Transloading (Appendix C)**
  - U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, Federal Register Volume 78, Number 134, 2013

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7.0 Acronyms

AAR	Association of American Railroads
ANSI	American National Standards Institute
DOT	Department of Transportation
FRA	Federal Railroad Administration
H_2S	Hydrogen Sulphide
PHMSA	Pipeline and Hazardous Materials Institute
PPE	Personal Protection Equipment
S_8	Orthorhombic Sulphur
SCBA	Self Contained Breathing Apparatus
SO_2	Sulphur Dioxide
TSI	The Sulphur Institute
^oC	Degrees Celsius
^oF	Degrees Fahrenheit

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Molten Sulphur Rail Tank Car Guidance

The Sulphur Institute (TSI) and the sulphur industry recognize that molten sulphur rail tank cars with formed, solid sulphur on ladders and handrails, tank car marks and stencils, and product identification panels presents a challenge to those responsible for handling rail tank cars and first responders for rapid and accurate identification in the event of an accident. In order to minimize occurrence of molten sulphur spills, there must be cooperation between shippers (suppliers) and customers (consumers) to identify locations where molten sulphur spills occur, and improve procedures to prevent future spills. Shippers and customers can provide valuable information to assist in identifying recurring locations of molten sulphur spills and take preventative action.

The presence of an excessive amount of formed, solid sulphur on molten sulphur rail tank car safety appliances, marks, or stencils displays a negative image of our industry to the public. Neither safety concerns nor negative public perceptions are acceptable to the sulphur industry and action is necessary to prevent molten sulphur spills and remedy any safety concerns.

To accomplish the objectives outlined, the following steps are prepared for guidance, along with attached photos showing examples and appropriate actions.

I. If a shipper identifies a molten sulphur rail tank car with a spill that represents a safety concern, the shipper will:
   - report the molten sulphur spill to management
   - arrange to remove the molten sulphur spill on site if permitted and safe to do so

   If for some reason removal cannot be accomplished on site, the shipper will arrange for offsite cleaning at an appropriate facility

II. If a customer identifies a molten sulphur rail tank car with a spill that represents a safety hazard, the customer will:
   - report the molten sulphur spill to management and the rail tank car shipper
   - be encouraged by the shipper to remove the molten sulphur spill on site

   If for some reason the customer cannot remove or arrange for removal on site, work with the shipper to arrange for offsite cleaning at an appropriate facility

III. If a significant spill is identified on safety appliances, marks, or stencils of a loaded molten sulphur rail tank car, it will be tagged (to include at a minimum, the date, location, and the phrase, “DO NOT LOAD”) to go to home shop after unloading at destination and its condition reported to the rail tank car shipper

IV. Shipper and Customer Report:
   - Each shipper and customer is strongly encouraged to share information about all spills and experiences in resolving incidents with particular focus on elimination of spills on safety appliances, marks, or stencils via email to transport@sulphurinstitute.org. This information will be aggregated and presented for discussion during TSI’s Environment, Health and Safety (EHS) and North American Transportation Regulations and Logistics (NATRL) Working Group meetings.

The Sulphur Institute

Molten Sulphur Rail Tank Car Guidance

Example of acceptable residue until next shopping

Example of acceptable residue until next shopping

The Sulphur Institute

Molten Sulphur Rail Tank Car Guidance

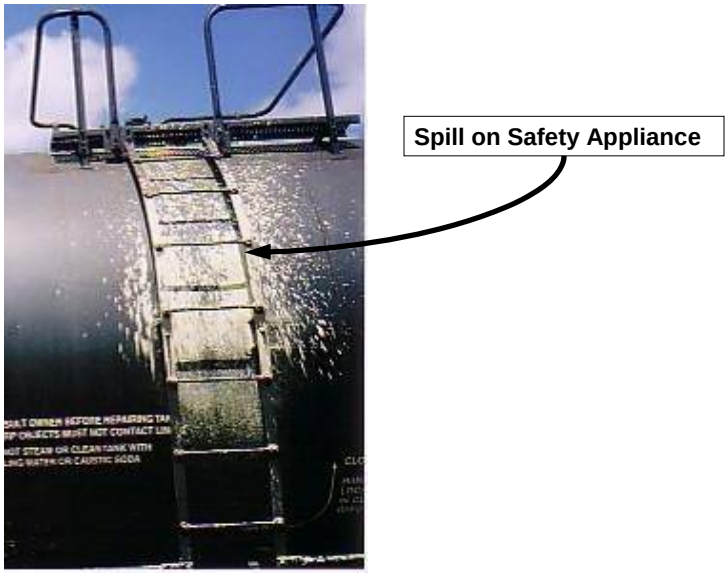
Example of acceptable residue until next shopping

Example of acceptable residue until next shopping

The Sulphur Institute

Molten Sulphur Rail Tank Car Guidance

Example of need to clean residue on safety appliance



Example of need to clean significant spill

ASSOCIATION OF AMERICAN RAILROADS

K.B. Dorsey
Executive Director - Tank Car Safety

January 18, 2013

CASUALTY PREVENTION CIRCULAR

(CPC-1245)

SUBJECT: **Pamphlet 34 Recommended Methods for the Safe Loading and Unloading of Non-Pressure (General Service) and Pressure Tank Cars** T9.2

TO: THE MEMBERS AND PRIVATE CAR OWNERS:

At the request of the Haz Mat (BOE) Committee, Pamphlet 34 has been reviewed and changes made to bring it inline with current best industry practices. The objective of the pamphlet is to promote the safe loading, unloading, and preparation for transportation of tank cars. The specific revised sections are:

- Removed existing wording under item 4 Section A
- New paragraph 13 under Section A
- New item 16 under Section B
- Replace existing wording of item 22 under section B
- Includes sections 6.0 through 6.6 and tables D7 through D13 of Appendix D of AAR MSRP Section C Part III (M-1002)

Note: The information provided within section 4 of Pamphlet 34 is a reprint of sections 6.0 through 6.6 and tables D7 through D-13 of Appendix D of AAR Manual of Standards and Recommended Practices Section C Part III “Specification for Tank Cars” (M-1002). NOTE: This material will continue to be maintained under Appendix D of AAR MSRP Section C Part III (M-1002).

The revised pamphlet is included in this circular and is in effect as of the publication date of this circular. This CPC-1245 supersedes CPC-1190. Under the provisions of Standard S-050, which may be found on the TTCI web site (AAR.com), this circular reflects the final action on this matter.

Respectfully Submitted,

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Pamphlet 34 -

Recommended Methods for the Safe Loading and Unloading of Non-Pressure (General Service) and Pressure Tank Cars

January 18, 2013

TABLE OF CONTENTS

Preface 4
Section 1: General Instructions for Loading and Unloading 5
Section 2: Loading a Tank Car 7
2.1 Before Loading a Tank Car 7
2.2 During Loading a Tank Car 9
2.3 After Loading a Tank Car 9
Section 3: Unloading a Tank Car 11
3.1 Before Unloading a Tank Car: 11
3.2 If Heater Coils Are Needed For Unloading 11
3.3 Unloading 12
3.4 After Unloading a Tank Car 13
Section 4: Reprint of Parts of M-1002 Appendix D 15
Section 5: Additional Information 29
5.1 Websites References 29
5.2 Regulation and Standard References 29

Preface

This document presents general guidelines for the selection of tank cars and recommended procedures for loading and unloading of the cars. It is not a complete and comprehensive set of methods, instructions or procedures applicable for all situations and car types. Each user company is encouraged to develop specific procedures using this document as a general guide where it applies. A particular location may require the use of additional or different precautions for the loading or unloading operations to be performed safely. Appropriate individual company procedures and applicable government requirements, including U.S. Department of Transportation (DOT) Hazardous Materials or Transport Canada (TC) Transportation of Dangerous Goods regulations, must be followed.

All repairs must be performed by properly Certified or Registered Tank Car Facilities. Experienced, trained personnel who are knowledgeable of the safety requirements and loading/unloading operations must be used. For loading and unloading of Hazardous Materials/Dangerous Goods, these knowledgeable persons must be designated as and trained as “HazMat”/or qualified employees per government regulations. Loading/ unloading personnel must be responsible for compliance with all company procedures and regulatory requirements during the complete operation. See regulatory references at the end of this document.

CAUTION: Since the loading and unloading of tank cars involves the opening of valves, fittings, flanges, caps, plugs and other closures there is always a possibility of product spillage or leakage. While this should be minimized the loader/unloader must be prepared to capture, collect and dispose of any spilled or leaked product in an environmentally-acceptable manner.

Appropriate Personal Protective Equipment (PPE) should be worn throughout the loading or unloading procedure.

Section 1: General Instructions for Loading and Unloading

1.1 The car must have the hand brakes set and the wheel(s) blocked against movement before any loading/unloading activities are started.

1.2 When the car is positioned for loading or unloading, securely block access to the track by use of derails, aligned and locked switches, bumper blocks or other such apparatus.

1.3 While a car is connected for loading/unloading, blue caution signs (sometimes known as “blue flags”) must be placed on the track as required by regulations and company procedures.

1.4 Before loading/unloading, inspect the car for damage. If found, contact the car owner for further instructions before loading.

1.5 Safety equipment such as safety showers and eye wash stations should be verified to be present and operational before conducting loading/unloading activities.

1.6 Proper tools should be used for loading/unloading operations. They must be clean and in proper condition at all times.

1.7 Tank car tanks containing flammable or combustible gases or liquids should be electrically grounded and bonded during loading and unloading operations. Grounding and bonding of cars carrying other commodities is also encouraged.

1.8 All loading/unloading inspections should be properly documented through a check list or similar method.

1.9 The loading/unloading area should have adequate lighting and be free of obstacles or unnecessary equipment.

1.10 During the loading/unloading process, cars must be attended by trained personnel or monitored by an approved monitoring system. Do not allow the loading/unloading operation to stand unattended or unmonitored while connections are attached to the car. If necessary to discontinue operations for a period of time, all valves must be closed, all connections removed and the car must be prepared as if ready for transportation. However, operations can be discontinued on an attended or monitored car by closing valves on the car and closing valves at the facility without disconnecting hoses.

1.11 When operating gauging devices, top operated bottom outlet valves, or any other top fittings or closures, loaders/unloaders should not:

1.11.1 Stand directly above or place any part of their body directly above the gauging device, valve, fitting, or closure.

NOTE: An excess flow valve is a device which closes automatically against the flow of the contents of the tank in case the external closure valve is broken off or removed in transit. Excess flow valves are neither designed, nor intended, to stop the flow of a tank car's contents in the event of a failure of a loading/unloading system's piping or hoses.

1.12 Prior to attempting to move the gage rod loosen the packing gland nut slightly. Do not use a wrench for additional leverage to raise and/or lower sticking gage rods. Remember to retighten the packing gland nut prior to offering for transportation.

1.13 During loading and unloading, the pressure in the tank must not exceed the lesser of:

75% of the pressure relief valve start-to-discharge pressure; or

75% of the tank test pressure; or

60% of the rupture disc burst pressure in a combination device.

NOTE: Limiting the pressure below the above values helps ensure that the pressure relief device will not function during product transfer operations. For example, for a DOT111A60W1 tank car with a 75 psig pressure relief device, the pressure within the tank must not exceed 45 psig. (75% of 60 psi). Maintaining the pressure below 75% of the pressure relief valve start-to-discharge pressure helps ensure that the pressure in the tank is below the vapor tight pressure of the device, and limiting the pressure below 60% of the rupture disc pressure in a combination device ensures the pressure is below the point which disc deformation may occur.

Section 2: Loading a Tank Car

2.1 Before Loading a Tank Car

2.1.1 Ensure that general procedures in Section A are followed.

2.1.2 Shippers must ensure that the tank car selected is authorized for the commodity being loaded. The tank car must comply with DOT or TC regulations and/or AAR's current Manual of Standards and Recommended Practices, Section C-Part III, (Specifications for Tank Cars, Specification M-1002).

2.1.3 The tank car must be of sufficient capacity, both by weight and volume to contain the quantity of the product being loaded. Applicable requirements such as outage, filling density or weight restrictions must be met. Consult the appropriate regulations/company policies for specific filling requirements.

2.1.4 Inspect the car for overall integrity and any visible damage. All safety appliances must be in proper condition. The car must show no sign of leakage and have no visible defects.

NOTE: During the inspection of the car, look for any items that are not typical of standard tank car designs as they may indicate a security breach – follow company-specific procedures or guidelines if such items are found.

2.1.5 Qualification stencils should be reviewed to confirm that the car is not overdue for any tests, qualifications or inspections. Do not load a car with overdue tests, qualifications or inspections.

2.1.6 All fittings, valves, gaskets and fasteners must be in proper condition, i.e. not corroded, torn, worn, stripped or otherwise damaged. Materials contacting the lading must be compatible with the product being loaded into the car.

2.1.7 Unless the car is cleaned/purged, ensure that the residue in the car is compatible with the product being loaded into the car. Do not load a car that has an unidentified residue.

2.1.8 If equipped with a safety vent, the rupture disc must thoroughly inspected. If equipped with a pressure relief valve, the valve must be inspected to ensure no debris is in its discharge area. If a combination pressure relief device is present each detection device (including, for example, telltale indicator or needle valve) should be checked to determine the integrity of the rupture disk. These devices must be closed prior to transportation.

2.1.9 If equipped with bottom outlet valve(s), the outlet cap(s) and/or plug(s) must be removed to check the bottom outlet valve for leakage. If equipped with

an auxiliary valve, open the auxiliary valve with its cap/plug removed to check the bottom outlet valve for leakage. Upon removal of the plug and/or cap or opening of the auxiliary valve, be prepared for the possible release of material from the outlet leg and from a leaking valve.

2.1.10 If equipped with a Top Operated Bottom Outlet Valve (BOV), if practicable, loosen the top packing nut and operate the valve to verify proper operation. Depending on findings, close the valve and tighten the top packing nut or stop the operation and repair the valve before loading the car.

CAUTION: This process may allow material to drain into the outlet leg of the car between its BOV and auxiliary valve.

2.1.11 If equipped with a Bottom Operated Bottom Outlet Valve, if practicable, operate the bottom outlet valve to verify its proper operation. Depending on findings, close the valve and lock the handle in the closed position or stop the operation and repair the valve before loading the car.

CAUTION: This process may allow material to drain into the outlet leg of the car between its BOV and auxiliary valve.

2.1.12 The bottom outlet plug and/or cap must remain off its fitting during entire loading process to ensure that the bottom outlet valve is not leaking. If equipped with an auxiliary bottom outlet valve, the auxiliary bottom outlet valve must be left open with the plug removed during the entire loading process to ensure that the primary bottom outlet valve is not leaking.

2.1.13 If equipped with a heating system, thoroughly inspect the exposed parts of the system. If the car is equipped with interior heater coils, remove the caps, be prepared for release of material and check for leaks prior to loading the car.

2.1.14 If so equipped, remove thermometer well cap and the magnetic gage rod cover cap slowly to determine if there is a leak. Inspect the o-ring on the thermometer well fitting and the magnetic gage rod body and replace as required. Verify that adequate ethylene glycol/anti-freeze mixture is present in the thermometer well to allow for taking an accurate product temperature reading.

2.1.15 Where applicable, connect the vapor valve to a recovery system. Open the vapor valve for displacement of the vapor before opening any product valve or manway.

2.1.16 If equipped with a hinged and bolted manway thoroughly inspect the manway nozzle and cover assembly assuring that:

2.1.16.1 The manway cover is functional, properly aligned and centered on the manway nozzle, hinge pin operates freely, is in place and not bent, cut or

damaged and the eyebolt slots and ears are not bent, worn, damaged or deformed. The cover must be free of commodity or other build up that would prevent proper operation of the eyebolts. The area adjacent to the gasket sealing surface must be free of commodity or other build up that would interfere with adjacent surfaces and adjacent areas must be free of corrosion or damage that would allow passage of commodity with the cover in the closed and bolted position.

2.1.16.2 The manway nozzle sealing surface is free of gouges, nicks, corrosion, displaced metal, residual commodity and remnants of old gaskets.

2.1.16.3 The manway gasket is in place, intact, has not taken a permanent compression set that interferes with sealing, is the style and design compatible with the manway nozzle assembly and is of a material compatible with the commodity.

2.1.16.4 The eyebolts, nuts and washers are not bent, damaged, corroded, and the assemblies are free of excess paint or commodity. Nuts and washers must be of size to fully bridge the eyebolt slots and washers must not be deformed. The manway nozzle is equipped with safety eyebolts at the proper locations opposite the hinge side of the nozzle.

2.1.16.5 The eyebolt pins and hinges are not bent, damaged, deformed or worn to the extent to prevent free movement of the eyebolts and proper engagement in the manway cover eyebolt slots.

2.2 During Loading a Tank Car

2.2.1 During loading continually monitor the car for any signs of leakage.

2.2.2 Ensure adequate outage space remains in the car when loading is completed to prevent overloading by volume or by weight and to allow expansion in transit. Refer to applicable regulations for correct outage, filling density and other weight restrictions for the commodity loaded.

2.3 After Loading a Tank Car

2.3.1 When loading is complete re-check the car for any signs of leakage. If there are any signs of leakage and if the leak cannot be stopped, the car must not be offered for transportation.

2.3.2 Document, per company procedures, the outage level, seal numbers and product identification information.

2.3.3 Close all valves after car is loaded. Verify there is no detectable leakage from valves, flanges, threaded connections and packing glands. Secure all plugs and outlet caps with a suitable tool. Use non-sparking tools if required

by company procedures. (PTFE, Teflon®, paste or not more than three wraps of PTFE tape have been found to be acceptable materials for use in sealing plugs and caps.) {Note: In most cases exterior coils should not have caps}. Do not offer the car for transportation if any leaks are found!

NOTE: Association of American Railroads Interchange Rules require that any leaky tank, regardless of the commodity carried, shall be stenciled, "LEAKY TANK, DO NOT LOAD UNTIL REPAIRED", in 3-inch letters, on each side adjacent to the car number, and the location of the leak must be identified by an "X". In addition, the car must be stenciled or decaled "HOME SHOP FOR REPAIRS DO NOT LOAD."

2.3.4 When securing a manway cover tighten the bolts using the appropriate star pattern and internal procedures. Lubricate manway eyebolts as required to maintain serviceability of the bolts and to ensure that proper torque values are achieved. Verify that the manway cover ears have not deformed or bent out of plane due to the torque applied to the eyebolts.

2.3.5 After loading, apply and hand-tighten magnetic gauge cover and thermometer well cap.

2.3.6 After the tank car has passed the appropriate leak test, top unloading valve handles that are not enclosed in a protective housing, must be removed before the car is offered for transportation.

NOTE: All valves, fittings, closures, plugs, caps, and fasteners are to be checked for tool tightness even if the item was not utilized during the unloading process (thermometer and magnetic gauging device covers with o-rings are to be hand tight, not tool tight.)

2.3.7 Product spillage on the tank exterior must be removed.

2.3.8 The car must be properly placarded and marked before it is offered for transportation.

Section 3: Unloading a Tank Car

3.1 Before Unloading a Tank Car:

3.1.1 General procedures in Section A should be followed.

3.1.2 All fittings seals should be examined before removing them for evidence of tampering.

3.1.3 Verify that valves and fittings are closed before removing plugs, caps and flanges.

3.1.4 Any dirt or debris should be removed from the fittings before opening them.

3.1.5 Before unloading, verify the contents of the tank car and of the receiving vessel for compatibility.

3.1.6 If the tank car is a general service car, relieve tank pressure by one or more of the following methods:

3.1.6.1 Slowly opening the vent valve.

3.1.6.2 Carefully open the fill hole cover or hinged manway cover. If using the manway cover for pressure relief, use caution when loosening bolts. The bolt(s) by the handle are the safety bolt(s). Loosen the safety bolt(s) by one or two turns at a time, and then loosen the remaining bolts.

3.1.6.3 If necessary, vent to a scrubber or vapor collection system.

NOTE: CAUTION should be exercised because any tank car may be under pressure.

NOTE: The vacuum relief valve should not be used to vent pressure.

NOTE: Atmospheric venting may create a safety and/or environmental hazard.

3.1.7 Venting is not necessary if the tank car is to be pressure-unloaded. However, a means to prevent over-pressure must be provided.

3.2 If Heater Coils Are Needed For Unloading

3.2.1 If equipped with interior heater coils, remove heater coil caps and check for leakage before connecting steam hoses.

3.2.2 Connect steam hoses to inlet connections of the heating system. Use a shut-off valve to control the steam flow. The tank should be vented before and during steaming to prevent excess pressure build-up.

3.2.3 Caution must be taken when applying steam to the system. Apply steam slowly until steam is observed at the heater coil outlet. Rapid expansion of the coils could cause breakage of the steam system. If steam is bubbling in the product, the interior steam coil is broken. Shut off the steam. If there is a dual system on the car, use the other bank. Report defects per company procedures to the shipper of the product and/or to the car owner.

3.2.4 Steaming operations should be carefully monitored to ensure the product or container does not become over-heated.

3.2.5 If the bottom outlet valve is steam jacketed, steam should be applied to the outlet steam jacket. DO NOT apply steam directly into the outlet chamber!

3.2.6 When unloading general service tank cars with protective linings it is important to remember that steaming of a partially filled tank car may damage the coating due to localized overheating. Once unloading is in process, steam pressure should be reduced or shut off to the car to avoid damaging the protective lining.

3.3 Unloading

3.3.1 When unloading through the bottom outlet, with the manway open, take care to prevent contamination of the product or, in the case of flammable materials, sparks or other sources of ignition.

3.3.2 Verify that the bottom valve is closed before loosening bottom outlet plug or cap.

3.3.3 Be prepared to collect any materials trapped in the bottom outlet leg upon loosening of the cap/plug assembly. Slowly loosen the outlet cap. If more than 2 - 3 quarts are collected in the containment system, there is a probability of bottom outlet valve leakage. Do not remove the cap completely. If the valve continues to leak tighten the cap/plug assembly. Inform the tank car owner of the leaking condition and request what action to take.

3.3.4 Before opening the unloading valves, securely attach the transfer system and perform a leakage test, if possible.

3.3.5 If a non-pressure tank car is being unloaded by pumping through the bottom outlet valve or top-mounted liquid valve, a means of preventing vacuum (which may cause a collapse of the tank) must be provided. Relieve all pressure used to unload the car, except for those products that may have a nitrogen padding applied. A warning should be applied in the manway area to indicate when nitrogen or other non-life supporting gas is present as a pad.

3.4 After Unloading a Tank Car

3.4.1 If the steam supply is still active, shut it off and remove connections. Check the heating coils for water removal and check for leaks per company procedures. If leaks are found, notify the car owner and/or the shipper.

3.4.2 Verify that all valves are closed.

3.4.3 Verify that all unloading connections are removed.

3.4.4 Secure all fittings, valves and openings in the appropriate manner. (All plugs and outlet caps must be secured with a suitable tool. Use non-sparking tools per company procedures when required.) Exceptions: Thermometer and magnetic gauging device covers with o-rings are to be hand tight, not tool tight.

NOTE: All valves, fittings, closures, plugs, caps, and fasteners are to be checked for tool tightness) even if they were not utilized during the unloading process again with the exceptions of thermometer and magnetic gaging device covers with o-rings that are to be hand tight, not tool tight.)

3.4.5 If the manway was opened during the operation, be sure to inspect the manway gasket for damage, deterioration and proper alignment. Tighten the manway bolts using the appropriate star pattern and torque values per company procedures.

3.4.6 If equipped with a safety vent, the rupture disc must be examined for integrity, proper burst-pressure rating and condition. If the tank car is to be reloaded at the same facility one inspection of the rupture disk may be adequate. The key requirement is that the rupture disk be thoroughly inspected per federal requirements prior to offering for transport with the following exceptions:

3.4.6.1 Residue of some class 8 and 9 materials by Special Permit in the USA and

3.4.6.2 24.2 Most/all residue cars in Canada except class 2.

3.4.7 Relieve all pressure used to unload the car, except for those products that may have a nitrogen padding applied. A warning should be applied in the manway area to indicate when nitrogen or other non-life supporting gas is present as a pad.

3.4.8 All cars (except class 9 material under certain circumstances) must be properly placarded and marked before being offered for transportation.

3.4.9 Ensure proper documentation for transportation is available.

3.4.10 Visually inspect the car to verify that no obvious defects are present.

NOTE: A car containing the residue of a dangerous good or hazardous material must be offered for transportation in the same condition as a car loaded with that material. It must be leak free, load placarded, marked, closed with seal present if required and properly documented.

Section 4: Reprint of Parts of M-1002 Appendix D

The information provided within this section includes a reprint of sections 6.0 through 6.6 and tables D7 through D-13 of Appendix D of AAR Manual of Standards and Recommended Practices Section C Part III "Specification for Tank Cars" (M-1002). NOTE: This material will continue to be maintained under Appendix D of AAR MSRP Section C Part III (M-1002).

6.0 HINGED AND BOLTED MANWAY COVER MAINTENANCE

At each tank qualification, the following inspections, maintenance operations, and tests shall be performed on each hinged and bolted nonpressure car manway assembly.

6.1 Manway Cover

6.1.1 Clean and visually inspect the gasket seating surface for defects. The surface is to be smooth and may have machining marks and/or 1/32-in.-deep concentric or spiral grooves machined into surface. Gouges, nicks, and other defects are acceptable up to 1/8 in. in diameter and 1/32 in. deep, provided all surrounding high spots are removed. Larger defects, or those suspected to impair sealing, shall be repaired by welding (except on covers made of ductile or malleable iron) and/or remachining, or by replacement. Machined gasket seating surfaces shall be smooth within 125-500 microinches RMS maximum roughness. Corroded or rusted gasket surfaces shall be cleaned to expose noncorroded or nonrusted metal. Surfaces that cannot be cleaned up shall be remachined or replaced.

6.1.2 Inspect cover operation. With the gasket removed, close the cover lightly and check that the hinge pin is free. Free up, if necessary. With a new gasket installed, close the cover lightly and check that at least 1/8-in. clearance exists at all possible contact interference points, such as at dimension "A" on the applicable manway style chart (Tables D7 through D12). Check cover for centering.

6.2 Gasket

Install a new gasket compatible with the commodity to be transported. Gasket size shall be as specified by the car manufacturer on the applicable manway style chart (Tables D7 through D12). As an alternative, manway nozzle rim style gaskets shown in Table D13 may be used, provided the gasket seats and seals properly. Care shall be exercised to remove existing commodity, old gasket, and gasket cement from gasket seating surfaces before carefully installing the new gasket.

6.3 Manway Nozzle

6.3.1 Inspect the gasket seating surface for gouges, nicks, and other defects. File, grind, or machine raised displaced metal as detected by a straight edge. After removing raised metal, defects that are deeper than 1/32 in. and are continuous across the gasket seating surface are not acceptable. Repair defects by welding and grinding/filing or by machining. The gasket seating surface shall be smooth within 125–500 microinches RMS maximum roughness with no defects deeper than 1/32 in. continuous across the gasket surface.

6.3.2 Inspect eyebolt and hinge lugs on the nozzle. Repair any distortion, corrosion, or cracks found.

6.4 Eyebolts and Nuts

6.4.1 Inspect eyebolts for corrosion, damaged threads, excess paint, and residual commodity. Any defect that prevents the required nut engagement by hand is cause for cleaning, repair, or replacement.

6.4.2 Gauge the major diameter of the external eyebolt threads over the nut clamping surface using a calibrated GO-NOGO gauge per ANSI/ASME B1.2, Table 1, or an equivalent calibrated gauge. The limiting dimension shall be the Class 1A minimum major diameter thread size.

6.4.3 Inspect eyebolt hinge pins. Pins are to be replaced if wear or corrosion exceeds 25% of original thickness.

6.4.4 Inspect to ensure that all manway eyebolt nuts on a given car are of the same configuration and size (i.e., heavy square or heavy hex).

6.4.5 Inspect safety eyebolts to ensure the cover cannot be opened while the tank is under pressure.

6.5 Testing

6.5.1 Any repairs to gasket seating surfaces or cover replacement require the manway to be gas tested for leaks at 15 psig minimum unless a hydrostatic tank retest is performed, subjecting the tank car's manway cover and gasket to tank test pressure.

6.5.2 If the manway securement fails the above testing, the manway nozzle should be checked for out-of-round condition, which may prevent a proper gasket seal.

6.6 Tightening of Bolts

6.6.1 Tightening sequence is to be as follows:

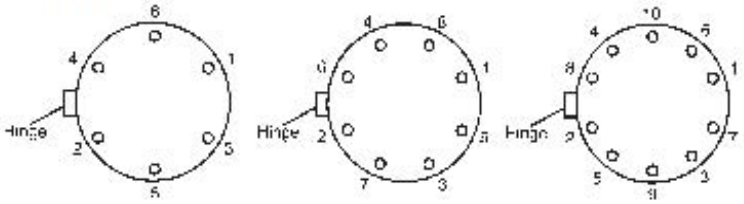


Fig. D5 Bolt tightening sequence

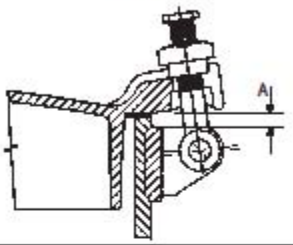
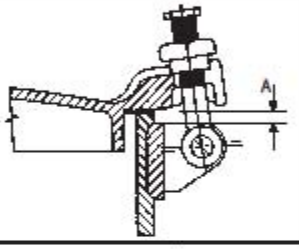
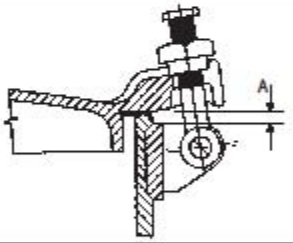
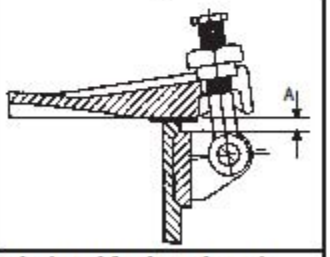
6.6.2 Determine that thread surfaces are clean.

6.6.3 Tighten nuts finger-tight.

6.6.4 Tighten nuts by wrench in sequential order per the appropriate bolt pattern.

6.6.5 After sequentially tightening, use rotational tightening and reverse rotational tightening until stable.

Table D7. Manway Style Chart for ACF Industries, Inc.[a] (page 1 of 3)

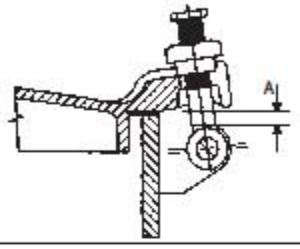
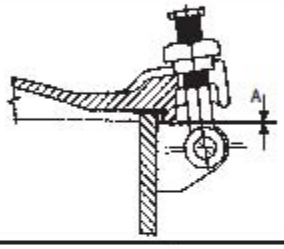
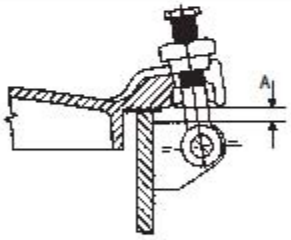
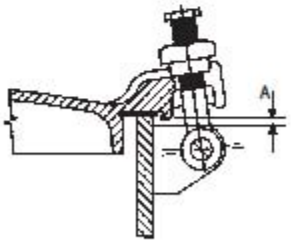
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THbtK)	Diagram[c]
ACF-1 (3152118)	18"/8	Elastomeric Hard	—— 19 1/4" × 17" × 1/8"	
ACF-2 (3156812)	20"/8	Elastomeric Hard	—— 21 1/4" × 18 7/8" × 1/8"	
ACF-3 (3156932) (3-A-0670)	18"/8	Elastomeric Hard	19" × 16 3/4" × 1/8" 19 1/4" × 16 7/8" × 1/8"	
ACF-4 (417-25270)	18"/8	Elastomeric Hard	20 1/2" × 17" × 1/8" 20 1/2" × 17" × 1/8"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D7. Manway Style Chart for ACF Industries, Inc.[a] (page 2 of 3)

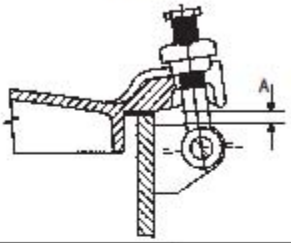
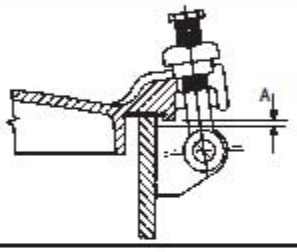
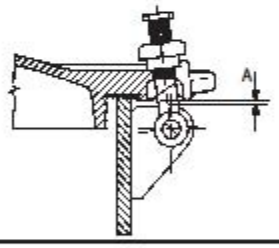
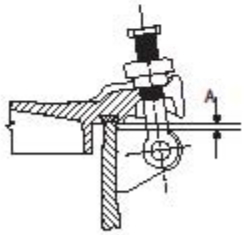
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THbtK)	Diagram[c]
ACF-5 (41-74527)	24"/8	Elastomeric Hard	25 1/4" × 22 7/8" × 1/8" 25 1/4" × 22 7/8" × 1/4" 25 1/4" × 22 7/8" × 1/8"	
ACF-6 (3-C-6848)	20"/8	Elastomeric Hard	21 7/8" × 19 1/2" × 1/8" 21 7/8" × 19 1/2" × 1/8"	
ACF-7 (3-A-5299C)	20"/8	Elastomeric Hard	21 1/2" × 18 3/4" × 1/4" 21 5/8" × 18 7/8" × 1/8"	
ACF-8 (3-N-3680)	18"/8	Elastomeric Hard	— 19 1/2" × 16 7/8" × 1/8"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D7. Manway Style Chart for ACF Industries, Inc.[a] (page 3 of 3)

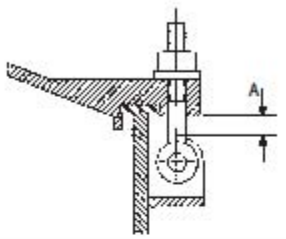
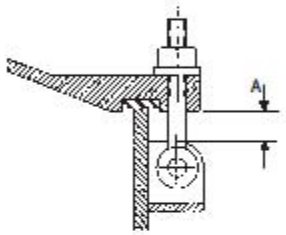
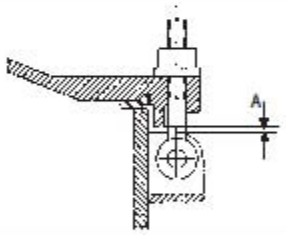
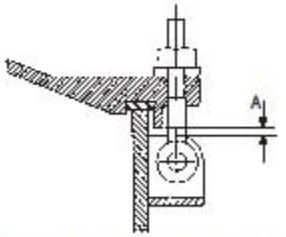
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THbtK)	Diagram[c]
ACF-9 (3-F-6077)	20"/8	Elastomeric Hard	— 21 1/4" × 18 7/8" × 1/8"	
ACF-10 (3-A-5299G)	20"/8	Elastomeric Hard	21 7/8" × 18 7/8" × 1/8" 21 7/8" × 18 7/8" × 1/8" 21 7/8" × 18 7/8" × 1/4"	
ACF-11 (5-K-2375) (5-K-4404)	20"/6	Elastomeric Hard	21 7/8" × 18 7/8" × 1/8" 21 7/8" × 18 7/8" × 1/8" 21 7/8" × 18 7/8" × 1/4"	
ACF-12 (3-D-5271)	20"/8	Elastomeric Hard	21 1/8" × 19 3/4" × 1/4" —	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D8. Manway Style Chart for General American Transportation Company[a] (page 1 of 3)

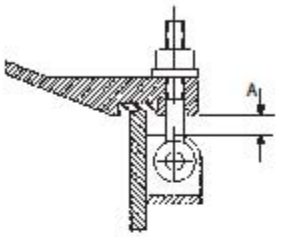
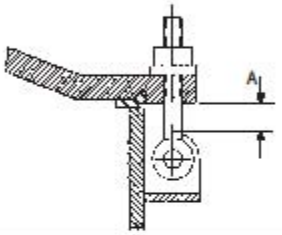
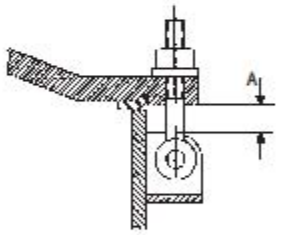
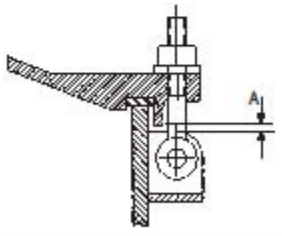
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
GATX #1	20"/6	Elastomeric Hard	22 1/8" × 19" × 1/4" 22" × 19" × 1/4"	
GATX #2	20"/6	Elastomeric Hard	22 1/8" × 19" × 1/4" 21 1/2" × 19 1/4" × 1/4"	
GATX #3	20"/6	Elastomeric Hard	21 7/8" × 19" × 1/4" 21 5/8" × 19" × 1/4"	
GATX #4	20"/6	Elastomeric Hard	21 1/2" × 18 5/8" × 1/4" 21 1/2" × 18 3/4" × 1/4"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D8. Manway Style Chart for General American Transportation Company[a] (page 2 of 3)

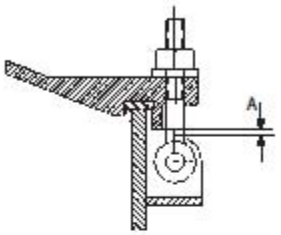
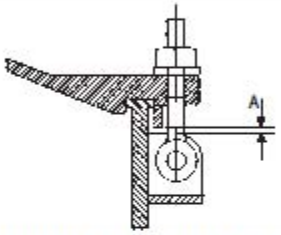
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
GATX #5	20"/6	Elastomeric Hard	22 1/4" × 19 1/4" × 3/16" 22 1/8" × 19 3/8" × 1/8"	
GATX #6	20"/8	Elastomeric Hard	21 7/8" × 19" × 1/4" 21 5/8" × 19" × 1/4"	
GATX #7	18"/8	Elastomeric Hard	19 1/2" × 17" × 1/4" 19 3/8" × 17" × 1/4"	
GATX #8	20"/8	Elastomeric Hard	21 1/2" × 19 1/4" × 1/4" 21 11/16" × 19 5/8" × 1/4"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D8. Manway Style Chart for General American Transportation Company[a] (page 3 of 3)

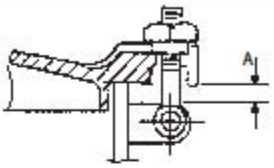
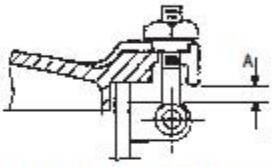
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
GATX #9	18"/8	Elastomeric Hard	19 5/8" × 17 1/2" × 1/4" 19 5/8" × 17 1/2" × 1/4"	
GATX #10	20"/10	Elastomeric Hard	21 1/4" × 19 5/8" × 1/4" 21 1/4" × 19 7/8" × 1/4"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D9. Manway Style Chart for General Electric Railcar Services[a]

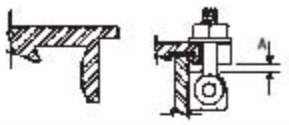
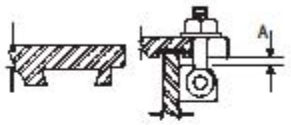
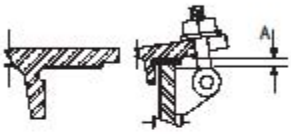
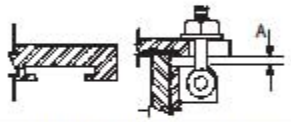
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
GE-1	18"/8	Elastomeric	19 3/8" × 17" × 1/8"	
GE-2	20"/8	Elastomeric	21 3/8" × 19" × 1/8"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D10. Manway Style Chart for Trinity Industries, Inc.[a]

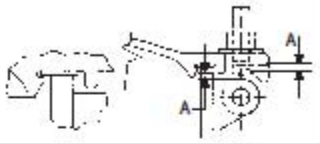
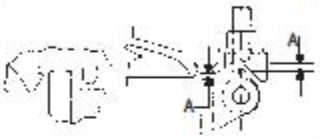
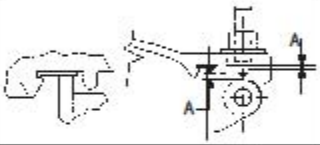
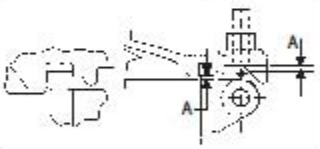
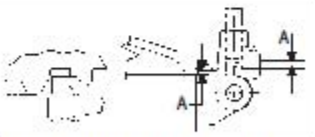
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
TRN-1	20" ID/6	Elastomeric Hard	21 1/2" × 19 1/4" × 1/4" 21 11/16" × 19 5/8" × 1/8"	
TRN-2	20" ID/8	Elastomeric Hard	21 1/2" × 19 1/4" × 1/4" 21 11/16" × 19 5/8" × 1/8"	
TRN-3	20" ID/8	Elastomeric Hard	21 1/2" × 18 7/8" × 1/8" 21 1/2" × 18 7/8" × 1/8"	
TRN-4	20" ID/10	Elastomeric Hard	22 1/4" × 19 1/4" × 1/8" 22 1/16" × 19 7/16" × 1/8"	

[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

Table D11. Manway Style Chart for Union Tank Car Company[a] (page 1 of 3)

Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[d]
UTC-1	20"/8	Elastomeric Hard	21 1/2" × 19 7/16" × 1/8" 21 12" × 19 7/16" × 1/8"	
UTC-2	18"/6	Elastomeric Hard	19 1/2" × 17 7/16" × 1/8" 19 1/2" × 17 7/16" × 1/8"	
UTC-3	18 1/2"/6	Elastomeric Hard	19 1/2" × 17 7/16" × 1/8" 19 1/2" × 17 7/16" × 1/8"	
UTC-4	20"/8	Elastomeric Hard	21 7/16" × 19 3/4" × 1/4" —	
UTC-5	20"/8	Elastomeric Hard	21 1/8" × 19 3/4" × 1/4" —	
UTC-6	20"/8	Elastomeric Hard	21 5/16" × 20 3/16" × 1/4" —	

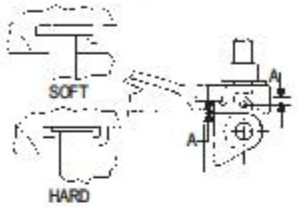
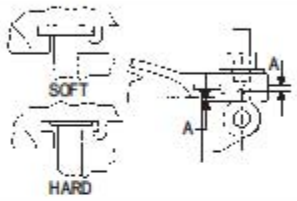
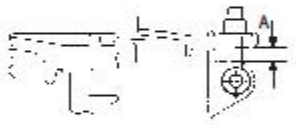
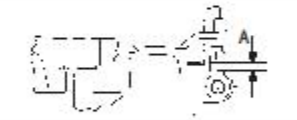
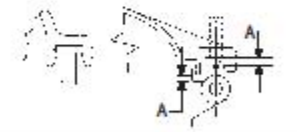
[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

[d] RTC denotes cars originally built by Richmond Tank Car Company.

Table D11. Manway Style Chart for Union Tank Car Company[a] (page 2 of 3)

Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[d]
UTC-7	20"/8	Elastomeric Hard	22 1/8" × 19" × 1/4" 21 13/16" × 19 9/16" × 1/8"	
UTC-8	18"/6	Elastomeric Hard	20 1/8" × 17" × 1/4" 19 13/16" × 17 9/16" × 1/8"	
UTC-9	21"/8	Elastomeric Hard	23" × 20 5/16" × 1/8" 23" × 20 1/2" × 1/8"	
UTC-10	20"/8	Elastomeric Hard	21 1/2" × 19 5/16" × 1/8" 21 1/2" × 19 5/16" × 1/8"	
UTC-11	20"/6	Elastomeric Hard	21 1/2" × 19 1/2" × 1/4" 21 1/4" × 19 1/2" × 1/8"	
UTC-12	18"/4	Elastomeric Hard	19 1/2" × 17 1/2" × 1/4" 19 1/4" × 17 1/2" × 1/8"	

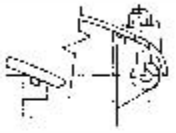
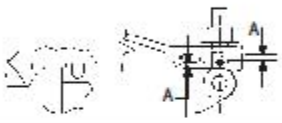
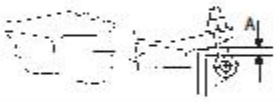
[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

[d] RTC denotes cars originally built by Richmond Tank Car Company.

Table D11. Manway Style Chart for Union Tank Car Company[a] (page 3 of 3)

Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
UTC-13	18"/8	Elastomeric Hard	19" × 18 1/2" × 1/4" dia. —	
UTC-14	18"/8	Elastomeric Hard	19" × 18 1/2" × 1/4" dia. —	
RTC-1[d]	20"/8	Elastomeric Hard	21 5/8" × 18 3/4" × 1/4" 21 5/8" × 18 3/4" × 1/8" 21 5/8" × 19" × 1/4"	
RTC-2[d]	20"/6	Elastomeric Hard	21 5/8" × 18 3/4" × 1/4" 21 5/8" × 18 3/4" × 1/8" 21 5/8" × 19" × 1/4"	
RTC-3[d]	18"/8	Elastomeric	19" × 16 3/4" × 1/8" dia.	

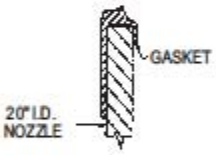
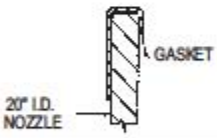
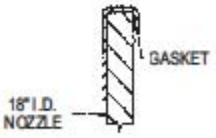
[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.

[b] Recommend manway bolts be lightly lubricated.

[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.

[d] RTC denotes cars originally built by Richmond Tank Car Company.

Table D12. Manway Style Chart for AAR Standard Gaskets[a]				
Manway Style	Nominal Dia./ Number of Bolts[b]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[c]
AAR-1	20"/6-8-10	Elastomeric Hard	21 11/16" × 19 1/2" × 1/4" 21 5/8" × 19 1/2" × 1/8"	See Figs. E26A, B, and C for typical manway cover gasket grooves.
[a] Alternative manway gasket styles shown in Table D13 may be substituted for those shown in this Manway Style Chart.				
[b] Recommend manway bolts be lightly lubricated.				
[c] Minimum 1/8-in. clearance required at "A" for gasket compression before tightening bolts.				

Table D13. Manway Style Chart for Alternate Manway Gasket Styles				
Manway Style	Nominal Dia./ Number of Bolts[a]	Gasket Type	Gasket Dimensions (OD × ID × THK)	Diagram[b]
GATX #3, 6, 7	See Manway Style Chart	Elastomeric	Bevel groove style	
GATX #3,6	20"/6 with 5/8"wall nozzle	Elastomeric	Nozzle rim style	
Various	20"/6-8-10 with 5/8" wall nozzle	Elastomeric or hard	Nozzle rim style	
Various	18"/6-8-10 with 5/8" wall nozzle	Elastomeric or hard	Nozzle rim style	
[a] Recommend manway eyebolts be lightly lubricated.				
[b] Check for interference between nozzle rim gasket and shear ring on manway cover.				

Section 5: Additional Information

5.1 Websites References

AAR/TTCI NAR Website - http://nar.aar.com
BOE/TTCI Website – http://boe.aar.com
Federal Railroad Administration (FRA) - http://www.fra.dot.gov/
DOT Hazmat Safety Homepage - http://hazmat.dot.gov/
Transport Canada (Dangerous Goods, TDG) - http://www.tc.gc/tdg/menu.htm
Transport Canada (Rail) - http://www.tc.gc.ca/rail/menu.htm

5.2 Regulation and Standard References

Hazard Materials Employee Training – 49 CFR 172.704
Dangerous Goods Employee Training – TDG Clear Language Regulations, Part 6
Empty Packaging – 49 CFR 173.29
Examination Before Shipping - 49 CFR 173.31(d) or CGSB 43.147, section 30.16
Tank Car Unloading (transloading only) – 49 CFR 174.67
Tank Car Loading and Unloading in Canada – CGSB 43.147, section 30.14
Stencil Leaky Tank – Field Manual AAR Interchange Rule 1, 3.e. and Rule 80 B. 6.
Hinged Manway Covers – AAR MSRP, M-1002, Appendix D.

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CFR part 395. The guidance implicitly imposes a recordkeeping requirement, but relieves both the carrier and the driver of any responsibility for maintaining a copy of the instructions at the principal place of business or on the CMV.

In addition, the current guidance includes an unenforceable performance standard for assessing the validity of a break that will be recorded as off-duty. The guidance states the break must be long enough to ensure that the accumulated fatigue resulting from driving the CMV will be significantly reduced.

FMCSA's Decision To Revise the Regulatory Guidance

In consideration of the above, FMCSA has determined the 1997 regulatory guidance should be revised to eliminate language that has the effect of discouraging drivers from taking breaks during the work day, or documenting such breaks in their logbooks. The FMCSA revises Question 2 to 49 CFR 395.2, to read as follows:

Hours of Service for Commercial Motor Vehicle Drivers Regulatory Guidance for 49 CFR 395.2, Definitions

Question 2: What conditions must be met for a commercial motor vehicle (CMV) driver to record meal and other routine stops made during a work shift as off-duty time?

Guidance: Drivers may record meal and other routine stops, including a rest break of at least 30 minutes intended to satisfy 49 CFR 395.3(a)(3)(ii), as off-duty time provided:

1. The driver is relieved of all duty and responsibility for the care and custody of the vehicle, its accessories, and any cargo or passengers it may be carrying.

2. During the stop, and for the duration of the stop, the driver must be at liberty to pursue activities of his/her own choosing.

Through the revision of the regulatory guidance, FMCSA makes clear that the motor carrier need not provide formal guidance, either verbal or written, to drivers with regard to the specific times and locations where rest break may be taken. The revised guidance also emphasizes that periods of time during which the driver is free to stop working, and engage in activities of his/her choosing, may be recorded as off-duty time, irrespective of whether the driver has the means or opportunity to leave a particular facility or location. All previously issued guidance on this matter should be disregarded if inconsistent with today's notice.

Issued on: July 5, 2013.

Anne S. Ferro,

Administrator.

[FR Doc. 2013–16687 Filed 7–11–13; 8:45 am]

BILLING CODE 4910–EX–P

DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Chapter I

[Notice No. 13–6]

Safety Advisory Guidance: Heating Rail Tank Cars To Prepare Hazardous Material for Unloading or Transloading

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), DOT.

ACTION: Safety advisory guidance.

SUMMARY: This guidance provides safety precautions and recommended guidance for persons responsible for unloading or transloading [1] hazardous materials from rail tank cars, specifically those persons heating a rail tank car to prepare its hazardous material contents for unloading or transloading. Further, this guidance reminds such persons of current regulatory requirements addressing this type of operation. PHMSA is issuing this guidance in coordination with the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA), and in consultation with the Federal Railroad Administration (FRA).

FOR FURTHER INFORMATION CONTACT: Cheryl West Freeman, Division of Engineering and Research, Pipeline and Hazardous Materials Safety Administration, 202–366–4545. For further information regarding OSHA regulations, contact OSHA, Office of Communications at 202–693–1999 and for further information regarding EPA's Risk Management Plan, go to: *www.epa.gov/emergencies/rmp.*

SUPPLEMENTARY INFORMATION:

I. Background
II. PHMSA's Coordinated Response With OSHA and EPA
III. Federal Regulations
A. Applicable PHMSA Regulations
B. Applicable OSHA Regulations or Standards
C. Applicable EPA Regulations
IV. Guidance for Heating of Rail Tank Cars for Unloading or Transloading

I. Background

PHMSA's mission is to protect people and the environment from the risks of hazardous materials transportation, including those loading and unloading operations covered under PHMSA regulations. Our efforts to enhance the safety of hazardous materials loading and unloading operations include development of standards for bulk loading and unloading of hazardous materials as part of our current strategic plan. Towards this end, on May 24, 1999, the Research and Special Programs Administration (PHMSA's predecessor agency) published a final rule [Docket No. RSPA–97–2718 (HM–225A), Hazardous Materials: Revision to Regulations Governing Transportation and Unloading of Liquefied Compressed Gases] that revised regulations applicable to the transportation and unloading of liquefied compressed gases. The revisions included new inspection, maintenance, and testing requirements for cargo tank discharge systems, including delivery hose assemblies, and revised attendance requirements applicable to liquefied petroleum gas and anhydrous ammonia. Also, more recently, on March 11, 2011, PHMSA published a Notice of Proposed Rulemaking [Docket Number PHMSA–2007–28119 (HM–247), Hazardous Materials: Cargo Tank Motor Vehicle Loading and Unloading] that proposes to amend our regulations to require each person (*i.e.,* carrier or facility) who engages in cargo tank loading or unloading operations to perform a risk assessment of the loading and unloading operation and develop and implement safe operating procedures based upon the results of the risk assessment. We received comments on the proposals in this NPRM and are currently evaluating the best course of action to address them.

As part of our continuing efforts to enhance the safety of hazardous materials loading and unloading operations, our combined effort with other Federal agencies to protect the public, and in response to the findings from an NTSB investigation, PHMSA is issuing this safety advisory guidance to all entities responsible for unloading or transloading of heated hazardous material from a rail tank car. In 1999 and again in 2002, accidents occurred as a result of the process of heating rail tank cars for unloading hazardous materials. On February 18, 1999, a rail tank car, which was on the unloading rack at the Essroc Cement Corporation

[1] As defined in § 171.8, *Transloading* means the transfer of a hazardous material by any person from one bulk packaging to another bulk packaging, from a bulk packaging to a non-bulk packaging, or from a non-bulk packaging to a bulk packaging for the purpose of continuing the movement of the hazardous material in commerce.

(Essroc) Logansport cement plant near Clymers, Indiana, sustained a sudden and catastrophic rupture that propelled the tank of the rail tank car an estimated 750 feet and over multistory storage tanks. The 20,000-gallon rail tank car initially contained about 161,700 pounds (14,185 gallons) of a toxic and flammable hazardous waste that was used as a fuel for the plant's kilns. There were no injuries or fatalities. Total damages, including property damage and costs from lost production, were estimated at nearly $8.2 million. The National Transportation Safety Board (NTSB) determined that the probable cause of the accident was the failure of Essroc to develop and implement safe procedures for heating rail tank cars for unloading hazardous waste (*i.e.,* toluene diisocyanate matter wastes). This lack of procedures resulted in the over-pressurization of the rail tank car due to chemical self-reaction and expansion of the toluene diisocyanate matter wastes.

On September 13, 2002, a 24,000-gallon-capacity rail tank car containing about 6,500 gallons of hazardous waste catastrophically ruptured at a transfer station at the BASF Corporation chemical facility in Freeport, Texas. The rail tank car had been steam-heated to permit the transfer of the waste to a cargo tank motor vehicle for subsequent disposal. The waste was a combination of cyclohexanone oxime, cyclohexanone, and water. As a result of the accident, 28 people received minor injuries. Residents living within one mile of the accident site had to shelter in place for five and one-half hours. The rail tank car, cargo tank, and transfer station were destroyed. The force of the explosion propelled a 300-pound rail tank car dome housing about ⅓ mile away from the rail tank car. Two storage tanks near the transfer station were damaged; that resulted in the released about 660 gallons of the hazardous material oleum.[2]

The NTSB investigated the Freeport, Texas accident and determined that the probable cause of the rupture of the rail tank car was over-pressurization resulting from a runaway exothermic decomposition reaction initiated by excessive heating of the hazardous waste material. The NTSB determined that BASF's failure to monitor the temperature and pressure inside the rail tank car while the hazardous waste was heated in preparation for unloading contributed to the accident. As a result of its investigation of the Freeport, Texas accident, the NTSB recommended that PHMSA, in cooperation with the OSHA and the EPA, develop regulations that require safe operating procedures to be established before hazardous materials are heated in a rail tank car for unloading; at a minimum, the NTSB recommended that the procedures should include the monitoring of internal tank pressure and cargo temperature (NTSB Recommendation R–04–10; December 15, 2004).[3]

II. PHMSA's Coordinated Response With OSHA and EPA

PHMSA believes the current regulations provide important requirements for the safe unloading of heated hazardous material from a rail tank car. However, we believe it is always beneficial to remind regulated entities of their duties in affecting safe transportation and to offer guidance in furtherance of performing these duties, and therefore, PHMSA, in coordination with OSHA and EPA, and in consultation with FRA, is issuing this safety advisory guidance. This safety advisory guidance is supplemental to the regulations and is provided as information for all entities responsible for unloading or transloading heated hazardous materials from a rail tank car, including employees responsible for overseeing the operation, inspecting and maintaining equipment, establishing emergency shutdown procedures, and developing safe operating procedures.

Specifically, this safety advisory guidance provides additional guidance on the recommended safety precautions affected entities should use when heating a rail tank car to prepare its hazardous material contents for unloading or transloading. Employing the recommended guidance summarized in this guidance will enhance safety and diminish the occurrence of incidents resulting from the over-pressurization and runaway exothermic decomposition reactions initiated by heating of hazardous material. We note, however, that there is no binding regulatory impact of the guidance offered in this guidance.

III. Federal Regulations

A. Applicable PHMSA Regulations

PHMSA's Hazardous Materials Regulations (HMR; 49 CFR Parts 171–180) specify requirements for the safe transportation of hazardous materials in commerce by rail car, aircraft, vessel, and motor vehicle. Requirements in the HMR apply to each person who offers a hazardous material for transportation in commerce, causes a hazardous material to be transported in commerce, or transports a hazardous material in commerce (see 49 CFR 171.1(b) and (c)). Transportation includes the movement of property and loading, unloading, or storage incidental to that movement (see 49 CFR 171.8).

In 49 CFR 172.700, PHMSA sets forth training requirements to ensure a hazmat employee has familiarity with the general provisions of the HMR, is able to recognize and identify hazardous materials, has knowledge of specific requirements of the HMR applicable to functions performed by the employee, and has knowledge of emergency response information, self-protection measures and accident prevention methods and procedures. Any hazmat employee (as defined in 49 CFR 171.8), including the designated employee, must be trained at least once every three years in accordance with the existing ''function specific'' training requirements in 49 CFR 172.704.

Unloading incidental to movement includes rail tank car transloading operations, such as the one that resulted in the Freeport, Texas accident described above (see 49 CFR 171.8). Rail tank car unloading operations conducted by consignee personnel after the rail tank car has been delivered to the consignee facility generally are not regulated under the HMR (see 49 CFR 171.1(d)(2)).

The HMR requirements applicable to rail tank car transloading operations are in 49 CFR 174.67. The operator of a facility at which transloading operations are performed must maintain written safety procedures governing transloading operations and must make the safety procedures immediately available to the employee responsible for rail tank car unloading. In addition, persons conducting transloading operations must take measures to prevent movement of the rail tank car and secure access to the track where the transloading operation takes place. During the transloading operation, the rail tank car must be attended or monitored at all times.

B. Applicable OSHA Regulations or Standards

OSHA's Process Safety Management (PSM) standard (see 29 CFR 1910.119) contains requirements for processes that use, store, manufacture, handle, or transport highly hazardous chemicals

[2] The Federal Railroad Administration has identified three other incidents involving heating of rail tank cars that did not result in death or injury.

[3] See *http://www.ntsb.gov/doclib/recletters/2004/R04_10.pdf.*

on-site.[4] Bulk [5] loading and unloading operations involving PSM-covered chemicals or other processes with PSM-covered chemicals are subject to the requirements of the PSM standard.[6] The PSM standard requires employers to compile process safety information (PSI) to enable employers and employees to identify and understand the hazards of the process. The PSI must include: (1) Physical and reactivity data of the highly hazardous chemicals in the process; (2) safe upper and lower limits of the process such as temperatures, pressures, flows and compositions; and (3) an evaluation of the consequences of deviation. Using the PSI, employers must perform a process hazard analysis to systematically identify, evaluate, and control the hazards of the process. After an employer completes a process hazard analysis, the employer must develop and implement written operating procedures providing clear, written instructions for safe operations of a process, such as loading and unloading operations to or from bulk containers (see 29 CFR 1910.119(f)). After the procedures are developed, each employee, including a contract employee, who is involved in loading and unloading operations must be trained in the required processes and the procedures, in accordance with 29 CFR 1910.119(g).

The OSHA standards also include requirements for the handling and storage of specific hazardous materials, including hazardous waste. Specifically, 29 CFR 1910.106(f) contains provisions for loading and unloading facilities. Additionally, the OSHA standard at 29 CFR 1910.120, pertaining to hazardous waste operations and emergency response, establishes requirements for emergency response operations. When there is a release of hazardous materials, or a substantial threat of a release, then emergency response operations must comply with 29 CFR 1910.120(q).

In situations where an operation or a material is not covered by the PSM standard or the other OSHA standards, employers are obligated under Section 5(a)(1)—''the General Duty Clause''—of the OSH Act of 1970 to protect employees from serious ''recognized'' hazards.

Under OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) standards in 29 CFR 1910.120, an employer must train workers exposed to hazardous substances, health hazards, or safety hazards before performing hazardous waste operations and emergency response. Specifically, 29 CFR 1910.120(e)(3) and (e)(4) detail the level of training required of workers, who perform cleanup operations or on-site management and supervisors of workers, and 29 CFR 1910.120(q)(6) details the level of training required of workers who perform emergency response.

Section 29 CFR 1910.120(e)(3)(i) specifies the training requirements for general site workers engaged in activities which expose or potentially expose those workers to hazardous substances and health hazards. These workers are required to receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained, experienced supervisor.

Section 29 CFR 1910.120(e)(3)(ii) specifies the training requirements for workers on site only occasionally for a specific limited task, who are unlikely to be exposed to hazardous substances and health hazards over defined permissible limits. These workers are required to receive a minimum of 24 hours of instruction off the site, and a minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor.

Section 29 CFR 1910.120(e)(3)(iii) specifies training requirements for workers who are regularly onsite in areas that have been monitored and fully characterized indicating that exposures are under permissible exposure limits and published exposure limits where respirators are not necessary, and the characterization indicates that there are no health hazards or the possibility of an emergency developing. These workers are required to receive a minimum of 24 hours of instruction off the site, and a minimum of one day actual field experience under the direct supervision of a trained, experienced supervisor. In accordance with 29 CFR 1910.120(e)(3), on-site management and supervisors directly responsible for, or who supervise employees engaged in the activities described above must receive 40 hours initial training, and three days of supervised field experience and at least eight additional hours of specialized training at the time of job assignment.

For all the levels of workers and their on-site management and supervisors, the OSHA training requirements described in 29 CFR 1910.120(e) and (q) would need to include training in all aspects of the heating process if that employee is responsible for performing any such functions, including refresher training every three years.

C. Applicable EPA Regulations

EPA regulations establish a general duty for facility owners or operators of facilities that produce, handle, process, distribute, or store certain chemicals to identify hazards associated with the accidental releases of extremely hazardous substances, design and maintain a safe facility as needed to prevent such releases, and minimize the consequences of releases. In addition, stationary sources with more than a threshold quantity of a regulated substance in a process are subject to EPA's accident prevention regulations, including the requirement to develop a Risk Management Plan (RMP) and submit the RMP to EPA (see 40 CFR Part 68). EPA's RMP requirements contain accident prevention measures that are virtually identical to those within the OSHA PSM standard.

In addition to the accident prevention requirements common to PSM, under 40 CFR Part 68, regulated facilities must perform a hazard assessment consisting of worst case and alternative release scenarios and a five-year accident history, implement an emergency response program, implement a management system, and develop and submit an RMP to EPA. Further, 40 CFR Part 112 establishes performance-based training requirements that would apply to any facility and covered operation, including facility transfers that handle certain chemicals in the specific quantities listed in 40 CFR 68.130.

IV. Guidance for Heating of Rail Tank Cars for Unloading or Transloading

Several Federal agencies share responsibility for the safety regulations of rail tank car unloading or transloading operations involving hazardous material—DOT (PHMSA and FRA), OSHA, and EPA. PHMSA, in coordination with OSHA and EPA, and in consultation with FRA, is issuing this safety advisory guidance to offer guidance on heating of a rail tank car to prepare solidified or viscous hazardous material products contained in the rail tank car for unloading or transloading. Based on existing regulatory requirements, we have assembled and coordinated the following guidance to

[4] 29 CFR 1910.119(b), defines a *highly hazardous chemical* as a substance possessing toxic, reactive, flammable, or explosive properties and specified by paragraph (a)(1) of § 1910.119.

[5] The use of this term with respect to the PSM standard is not the same as defined in the PHMSA HMR.

[6] Both of these processes may be covered by OSHA's PSM depending on the flash point of the waste material and the other chemicals present in the process. For operations with hazardous materials, OSHA recommends implementation of management systems such as those required by the PSM standard, regardless of coverage.

raise awareness of those requirements and the risks associated with heating rail tank cars. This guidance does not include all of the aspects applicable to the safe heating of rail tanks cars; rather, it focuses on the issues raised in the NTSB recommendations as a result of its investigations into the two incidents cited above.

Procedures. The shipper or facility operator, if not the same, should develop written safe operating procedures to be used when hazardous materials are heated in a rail tank car for unloading or transloading. The procedures should, at a minimum, establish hazard controls necessary to protect workers, the public, and the environment from adverse consequences, and include:

- Detailed information regarding the chemical characteristics of the material such as, melting temperature, flash point, the degree to which the hazardous material expands as a result of heating, and additional risk if the hazardous material reacts with air or water.;
- The pressure created by heating the rail tank car at which the material may safely be unloaded or transloaded from the rail tank car;
- Active monitoring and recordkeeping requirements of the internal tank pressure and material temperature during the heating process. The heating process should be monitored with time intervals (such as hourly) that are dependent upon the nature and history of materials being heated;
- Potential consequences of deviations from standard operating procedures and how to identify, control and respond to those consequences; and
- Training of all entities involved in the unloading or transloading process.

These procedures should be maintained in a location where they are immediately available to employees responsible for the heating, unloading or transloading operation. These procedures should clearly define employees' roles and responsibilities for the heating of a rail tank car, as well as the roles and responsibilities of contractor personnel that are employed at a facility to conduct the operations for heating of a rail tank car.

Monitoring. The facility operator should be knowledgeable of the chemical properties of all of the materials involved in the heating process, including the reactivity of those materials, and ensure that the heating process (*i.e.,* pressure, temperature, and heating rate) applied to the rail tank car, and the pressure and temperature inside the rail tank car should be monitored to ensure that it does not result in over-pressurization of the rail tank car.

Monitoring should be conducted at the necessary frequency as heating continues until the material reaches its recommended parameters (*e.g.,* viscosity and temperature) for safe unloading or transloading. Certain chemicals, such as a material that can undergo rapid exothermic decomposition, may require more frequent or even continuous monitoring during heating. Monitoring of the tank pressure and the temperature of the hazardous material includes measures to ensure that the heating rate does not result in over pressurization of the rail tank car.

As an additional aspect of monitoring, the facility operator may, when practical and safe, and the physical state of the material allows, sample the material that is in the rail tank car to verify the material and its chemical and physical properties. The rail tank car contents should be monitored at multiple times as heating continues until the material is determined to be at its recommended parameters (*e.g.,* viscosity and temperature) for safe unloading or transloading.

Designated Employee. The facility operator should designate an employee responsible for monitoring the heating process. Prior to the onset of operation, the designated employee should be made thoroughly knowledgeable of the nature and properties of the material contained in the rail tank car and procedures to be followed in the event of an emergency. In the event of an emergency, the designated employee should have the ability and authority to take responsive action.

Training. Hazardous materials employees involved in heating rail tank cars for unloading or transloading operations should be trained in all aspects of the heating process that each employee is responsible for performing. Further, the level of training for each employee should correlate with that employee's level of exposure to hazardous materials at the facility where rail tank cars are heated for unloading or transloading. Please refer to the Section III for a discussion of specific training obligations under applicable Federal regulations.

Issued in Washington, DC, on July 8, 2013, under authority delegated in 49 CFR Part 106.

Magdy El-Sibaie,

Associate Administrator for Hazardous Materials Safety.

[FR Doc. 2013–16672 Filed 7–11–13; 8:45 am]

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