



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

MAY 31 2017

Mr. John Freiler
Engineering Manager
Truck Trailer Manufacturers Association (TTMA)
7001 Heritage Village Plaza, Suite 220
Gainesville, VA 20155

Reference No. 16-0082

Dear Mr. Freiler:

This letter is in response to your May 11, 2016, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the accident damage protection requirements for certain specification DOT cargo tank motor vehicles (CTMVs) found in § 178.345-8. Specifically, you ask about the requirement for protecting piping, or any device, that if damaged in an accident could result in loss of lading.


We have paraphrased and answered your questions as follows:

- Q1. You seek confirmation of your understanding that the requirement to provide protection of 'piping, or any device, that if damaged in an accident could result in the loss of lading' in § 178.345-8(a)(2) extends to components such as the dust cap, which do not carry lading during transit but could transfer significant forces to areas that do contain lading.
- A1. Your understanding is correct.
- Q2. You seek confirmation of your understanding that the 6-inch horizontal set-back design, required as part of the rear-end protection provision in § 178.345-8(d)(1), also applies to the dust cap, arms, and hand valves even if these elements do not normally carry lading during transit.
- A2. Your understanding is correct. The dust cover and hand valve must be included in the 6-inch horizontal set-back design as they are part of the piping system. However, if the piping includes a stop valve and a sacrificial device such as a shear section, then the piping is considered protected.
- Q3. You ask whether the requirement in § 178.345-8(a)(2) concerning protection against loss of lading as mentioned in Q1 applies to other cargo tank piping that is attached but not associated with an outlet valve. You also ask whether § 178.345-8(a)(2) applies to air or vapor lines installed according to good industry practice (e.g., TTMA RP 102).

- A3. The answer is no. The provisions in § 178.345-8(a)(2) do not apply to piping that if damaged in an accident could result in a loss of lading from the cargo tank but is not required by the applicable specification.
- Q4. You ask whether the 6-inch set-back provisions contained in § 178.345-8(d)(1) apply to the air and vapor lines mentioned above.
- A4. The answer is no. The rear-end cargo tank protection device requirements contained in § 178.345-8(d)(1) do not apply to piping that if damaged in an accident could result in a loss of lading from the cargo tank but is not required by the applicable specification.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,



Dirk Der Kinderen
Chief, Standards Development
Standards and Rulemaking Division

Nickels
§ 178.345-8
Accident damage protection
16-0082

Dodd, Alice (PHMSA)

From: Nickels, Matthew (PHMSA)
Sent: Wednesday, May 11, 2016 12:01 PM
To: Hazmat Interps
Subject: FW: Request for interpretation re: piping setback.
Attachments: TTMA Interp Letter Request May 2016.pdf

Hi Shante/Alice,

Please enter this letter of interpretation request, and assign it to Matt Nickels.

Thanks,
M

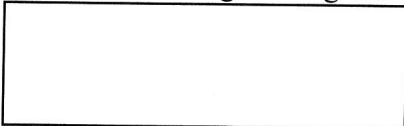
From: John Freiler [<mailto:john@ttmanet.org>]
Sent: Wednesday, May 11, 2016 10:42 AM
To: Nickels, Matthew (PHMSA)
Cc: Carrie Renuart; Jeff Sims; Nancy Livingston
Subject: Re: Request for interpretation re: piping setback.

Hi Matt,

See the attached letter and RP. It should address your concerns; if not, let me know.

Thanks!

John Freiler - Engineering Manager



Truck Trailer Manufacturers Association
7001 Heritage Village Plaza
Suite 220
Gainesville, VA 20155-3094

703-549-3010 - Phone

May 11, 2016

U.S.DOT
PHMSA-Office of Hazardous Materials Standards
Attn: PHH-10
East Building
1200 New Jersey Ave, SE
Washington, DC 20590

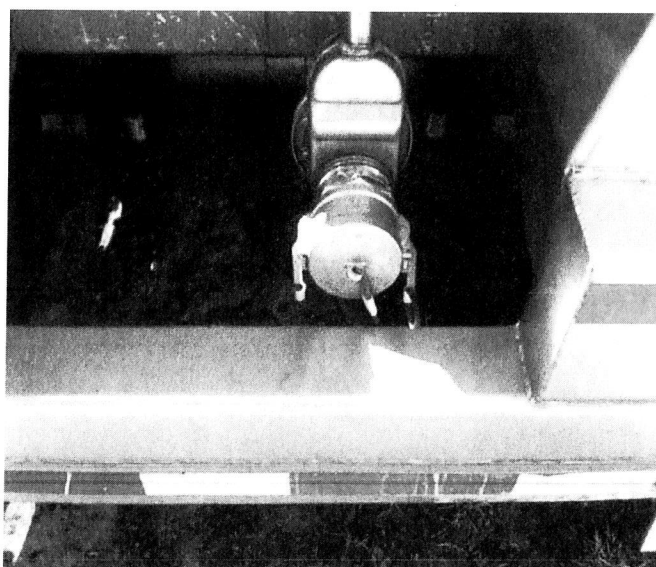
Phmsa.hm-infocenter@dot.gov

Subject: Request for Interpretation

Dear Sirs;

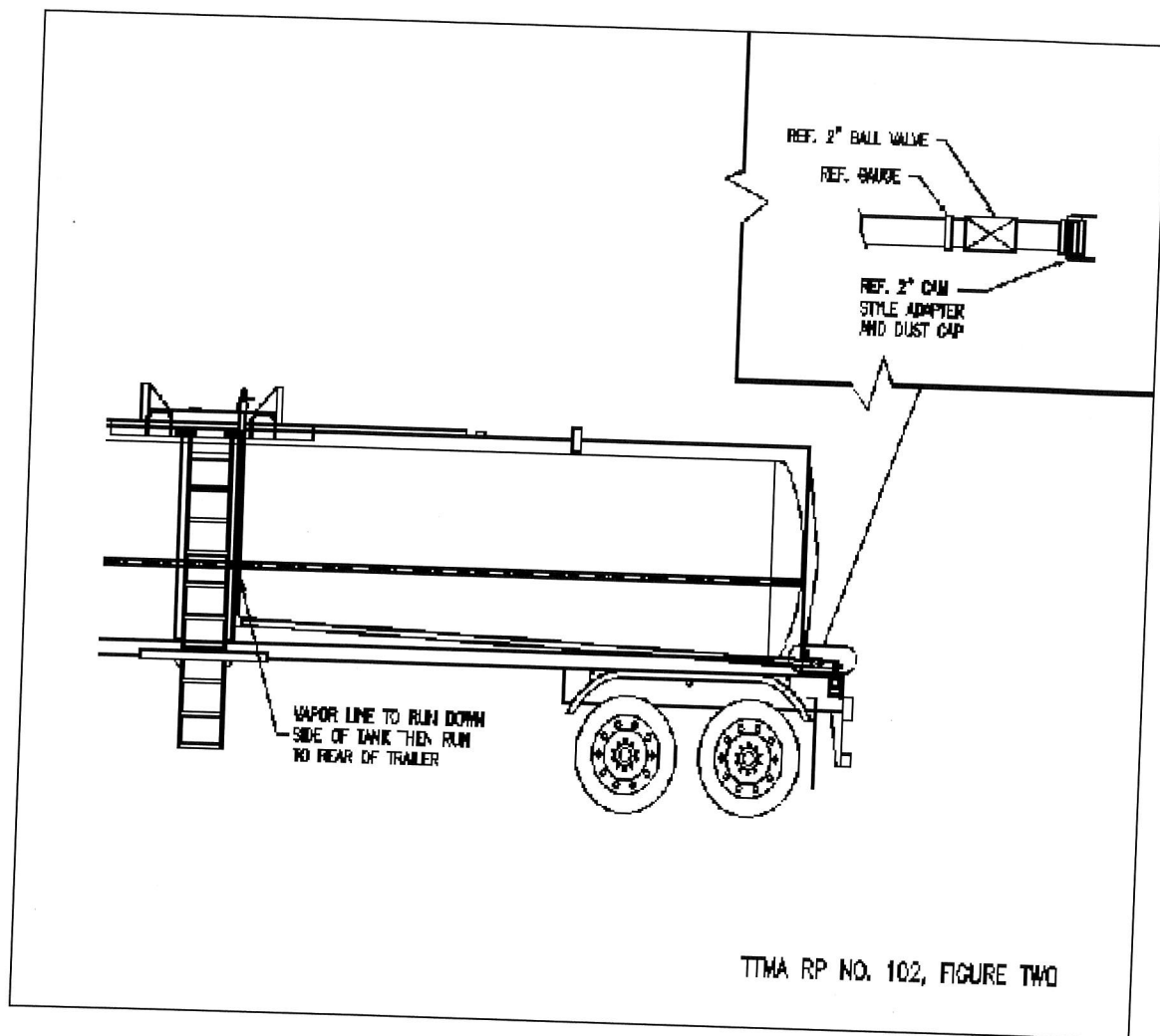
The Truck Trailer Manufacturers Association (TTMA) is an international trade association representing approximately 90% of the trailers manufactured in the United States. This request for interpretation concerns §178.345-8 Accident Damage Protection and the interactions between paragraphs (a)(2) and (d) of that section.

It has come to TTMA's attention that the agency is considering that the requirement for protecting "piping, or any device that if damaged in an accident could result in loss of lading" in §178.345-8(a)(2) includes the dust cap and its arms when evaluating the 6" horizontal set-back rule in §178.345-8(d)(1) even if such are not normally carrying lading. The rationale is that the dust cap and other components are substantial and could transfer significant forces through to areas that do contain lading in transit. See the following photo:



Our concern is if PHMSA views the hand valve and dust cap to be an extension of the piping, which, despite not containing lading during transit, could damage the lading containing portions of the cargo tank; such thinking could be used expansively for other cargo tank piping not associated with the bottom outlet valve shown in the picture.

Compressed air and vapor lines are often run to the top of the cargo tank to provide ground level access points for operators as a safer alternative to ascending the ladder of the cargo tank with hoses to either inject air or remove vapors. A common industry practice is shown in the accompanying illustration:



As can be seen in the drawing, the piping involved does not pose a risk of tank puncture in a rear end collision: it is both too long and narrow to transfer significant accident damage loads into the shell of the tank, and it is protected by a sacrificial segment as it enters the overturn protection.

We would like you to clarify that the "piping or any devices that if damaged in an accident could result in a loss of lading" referred to in §178.345-8(a)(2) does not include air or vapor lines installed according to good industry practice such as that described in TTMA RP 102. (copy attached) Further, that the 6" set-back provisions contained in §178.345-8(d)(1) also do not apply to these air or vapor lines.

Thank you for considering our request for interpretation. If you have any questions concerning this letter, please do not hesitate to contact the undersigned.

Sincerely,

John Freiler
Engineering Manager

Enc.

TTMA

Recommended Practice

RP No. 102-13
April 26, 2013

Truck Trailer Manufacturers Association
8506 Wellington Rd. / Suite 101
Manassas, VA 20109
(703) 549-3010
www.ttmanet.org

Title: Vapor Recovery Line Configurations for DOT 407 and DOT 412 Cargo Tanks

Previous Editions: Originally Issued April 2002; Reissued May 2008, April 2013.

1.0 Preface:

- 1.1 No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system without written permission from the Truck Trailer Manufacturers Association.
- 1.2 Recommended Practices and Technical Bulletins are furnished by the TTMA as a guide to general practices in the manufacture, use, and repair of truck trailers. However, the scope of the TTMA's Recommended Practices and Technical Bulletins is not exhaustive of all general practices in the manufacture, use, and repair of truck trailers and there may exist such general practices which do not appear in either the Recommended Practices or Technical Bulletins.
- 1.3 Recommended Practices and Technical Bulletins represent the state-of-the-art that existed at the time of its preparation. Users of Recommended Practices and Technical Bulletins should familiarize themselves with advancements in practices that have occurred subsequent to the Recommended Practice's or Technical Bulletin's publication date.
- 1.4 The TTMA has not undertaken any evaluation of all the conceivable ways in which Recommended Practices or Technical Bulletins may be used by manufacturers, users, or repairers of truck trailers nor the consequences of such uses. Everyone who uses Recommended Practices or Technical Bulletins must first satisfy himself or herself that his or her safety, the safety of others, or the safety of the truck trailer and any other equipment will not be jeopardized by their use of information contained within the Recommended Practices or Technical Bulletins.
- 1.5 The Recommended Practices and Technical Bulletins may contain terms or words with specialized meanings. Definitions for such terms or words may be found in TTMA RP No. 36 - Tank Trailer and Tank Container Nomenclature or TTMA RP No. 66 - Trailer Nomenclature.
- 1.6 Within the Recommended Practices and Technical Bulletins, "shall" is used wherever conformance with the TTMA publication requires that there be no deviation from the specific recommendation. "Should" is used wherever deviation from the specific recommendation is permissible in complying with the TTMA publication.
- 1.7 Conformity with TTMA publications by manufacturers, users and repairers of truck trailers is voluntary and any non-conformity with such publications is not indicative of the non-conforming practice being deficient.
- 1.8 Any inclusion of Recommended Practices or Technical Bulletins within any contract, document or standard is voluntary, and any such inclusion shall not imply any endorsement or approval by the TTMA due to the multitude of ways in which the Recommended Practices or Technical Bulletins may conceivably be used.

2.0 Purpose

- 2.1 This Recommended Practice establishes standard configurations for vapor recovery lines on DOT 407 and DOT 412 cargo tanks. These configurations provide for top (of the tank) and bottom (near the tank outlet) vapor recovery.
- 2.2 Standardization of these lines allows for industry personnel (at carriers, wash racks, shippers and consignees) to become familiar with a common arrangement. Furthermore, this standardization controls equipment cost by precluding the development of several unique devices and line designs, and preventing the need for each carrier to create line specifications.
- 2.3 The configurations established may not work for all applications. Therefore, the personnel employed by companies using these configurations must determine if a tank trailer's vapor recovery line meets essential criteria for the loading/unloading of particular products at specific sites.
- 2.4 This RP is not intended to address the retrofit of vapor recovery systems on existing cargo tanks. Such an activity requires the involvement of a design certifying engineer to satisfy the requirements of 49 CFR 180.413.
- 2.5 Similarly, this RP is not intended to cover the proper methodology for cleaning vapor recovery lines. Such methodology is the responsibility of the cleaning facility and the operators of the cargo tank.

3.0 Background

Increasingly, the recovery of potentially harmful vapors associated with certain hazardous materials has become mandated by Federal, state and local governments, and by shippers. Accordingly, DOT 407 and DOT 412 cargo tanks are commonly specified with a line to recover vapors during loading and unloading.

4.0 Tee Style Hydraulically Actuated Vapor Recovery Valve (hereinafter, VR-valve)

4.1 Dimensions

- 4.1.1 The over-all height of the VR-valve when closed shall not exceed eight and one-half (8.5) inches. Where possible, the CTMV manufacturer should provide adequate top accident damage protection clearance to facilitate the use of a VR-valve with a height of 8.5 inches even if the original equipment VR-valve has a lesser height.
- 4.1.2 The over-all width of the VR-valve, measured from outlet to outlet, shall be seven (7) inches.
- 4.1.3 The measurement from the tank seal face to the centerline of the VR-valve outlets shall be three and three-sixteenths (3.1875) inches.

- 4.1.4 See Figure Four in the Appendix for a pictorial representation of the above dimensions.
- 4.2 Actuation pressure
 - 4.2.1 The pressure required to actuate the VR-valve shall not exceed 275 psi.
 - 4.2.2 The design certifying engineer should ensure the actuation pressure of the cargo tank's self-closing stop-valve is at least 50 psi greater than the VR-valve fitted on the cargo tank.
 - 4.2.3 In some cases, operating personnel may need to open the VR-valve without opening the cargo tank's self-closing stop-valve: One such case is the application of pressure to the tank through the VR-valve after the tank is loaded. The plumbing schematic in Figure Five illustrates how to accomplish this isolated valve opening. By using a manual control valve with an internal check valve in the hydraulic line to the self-closing stop-valve, the VR-valve can be isolated. The internal check valve allows free flow back to the pump or remote control device in case the control valve is inadvertently closed after opening the self-closing stop-valve. The check valve feature must be present to satisfy the requirements of 49 CFR 178.345-11(b)(1).
- 4.3 Positive indication of opening
 - 4.3.1 The VR-valve shall have a visual means to provide positive indication of its actuation. If the indication cannot reasonably be made visible, another means of positive indication should be provided. This other means of indication may be audible or electronic.
 - 4.3.2 The VR-valve shall be designed and manufactured to preclude the possibility of a false indication of opening.
- 4.4 Flow
 - 4.4.1 The VR-valve shall be marked with its minimum through area in square inches when fully open.
 - 4.4.2 When loading or unloading, the pressure drop through the vapor recovery system includes losses at the VR-valve, the piping on the cargo tank and any hoses, piping and valves at the shipper's or consignee's facility. The absolute pressure in both tanks and the piping further affects these losses. All of these losses (if known) should be accounted for by the design certifying engineer when establishing the maximum allowable loading and unloading rates for the cargo tank.

4.5 Cleaning

4.5.1 The VR-valve shall be easily disassembled to allow for frequent and expeditious cleaning.

4.6 Inlet

4.6.1 The inlet of the VR-valve shall be a 3" female NPT swivel connection.

4.7 Outlet Ports

4.7.1 The outlet ports of the VR-valve shall be 2" male NPT connections.

4.8 Isolation of Hydraulics

4.8.1 The hydraulics of the VR-valve shall be isolated from any space that may come in contact with products transported in the cargo tank.

5.0 Top Configuration

5.1 Pressure Gauge

5.1.1 A pressure gauge shall be provided in the spill dam to allow operators to read tank pressure.

5.1.2 Another gauge to read line pressure may be provided if specified by the end user. Because of the limited volume of air contained within the top vapor recovery line, this gauge is not mandatory.

5.2 Placement of VR-valve

5.2.1 The VR-valve shall be located as close as practicable to the transverse and longitudinal centerline of the spill dam.

5.2.2 When possible, the top unload outlet port of the VR-valve should be located above the respective spill dam side to facilitate ease of connecting the plant vapor line.

5.2.3 If a ladder is attached adjacent to the spill dam, the VR-valve should be placed in a location on the longitudinal axis of the tank to allow an operator to connect the plant vapor line while supported on the top platform of the ladder.

5.3 Top Vapor Recovery Line

5.3.1 The top vapor recovery line shall extend off the ladder side of the VR-valve and consist of a 2" ball valve followed by a 2" camlock adapter and dust cap.

5.3.2 This line shall be braced by a support attached to the respective spill dam side (and not the spill dam floor).

5.4 Reference

- 5.4.1 For visual representation of the top configuration, see Figure One in the Appendix.

6.0 Bottom Configuration

6.1 Bottom vapor recovery line

- 6.1.1 The bottom vapor recovery line shall extend off the opposite side of the VR-valve and consist of a 2" union and 2" (minimum) inside diameter piping over the spilldam side to the outlet area of the cargo tank.
- 6.1.2 Inside the spilldam area a vertical sacrificial device shall be provided. This device must break under strain at no more than 70% of the strength of the weakest piping element between the VR-valve and the sacrificial device.
- 6.1.3 This line shall be braced by a support attached to the respective spilldam side (and not the spilldam floor) located inside of the sacrificial device specified in 6.1.2.
- 6.1.4 A minimum slope shall be provided in the entire bottom vapor recovery line to assure complete drainage of any liquid.
- 6.1.5 Near the outlet of the cargo tank the following devices and fittings shall be provided:
- 6.1.5.1 A gauge to read line pressure,
 - 6.1.5.2 A 2" ball valve, and
 - 6.1.5.3 A 2" camlock adapter and dust cap.

6.2 References

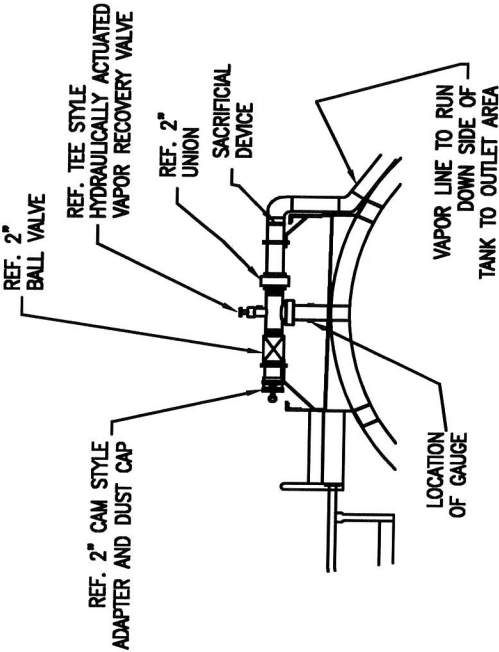
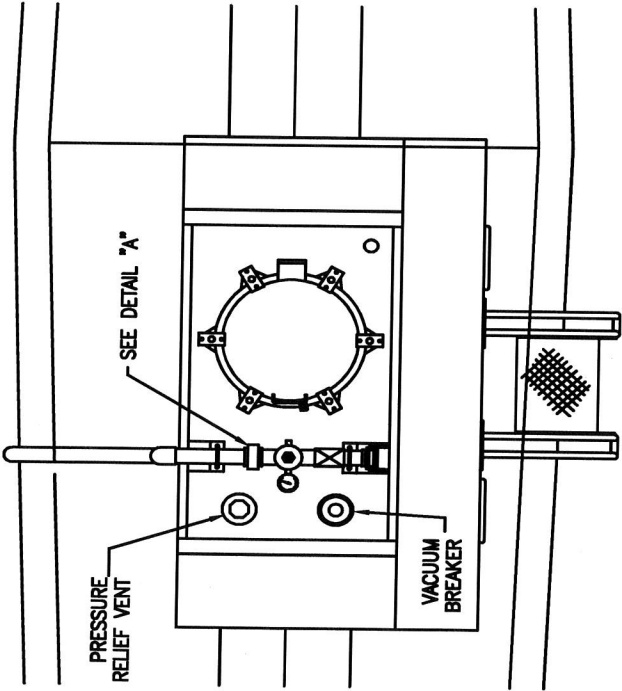
- 6.2.1 For visual representation of the bottom configuration, see Figures Two and Three in the Appendix.

7.0 Multi-Compartment Cargo Tanks

Multi-compartment cargo tanks manufactured to the DOT 407 or DOT 412 specifications may haul dissimilar products in different compartments. Therefore, to preclude contamination the vapor recovery lines on multi-compartment tanks should not be manifolded.

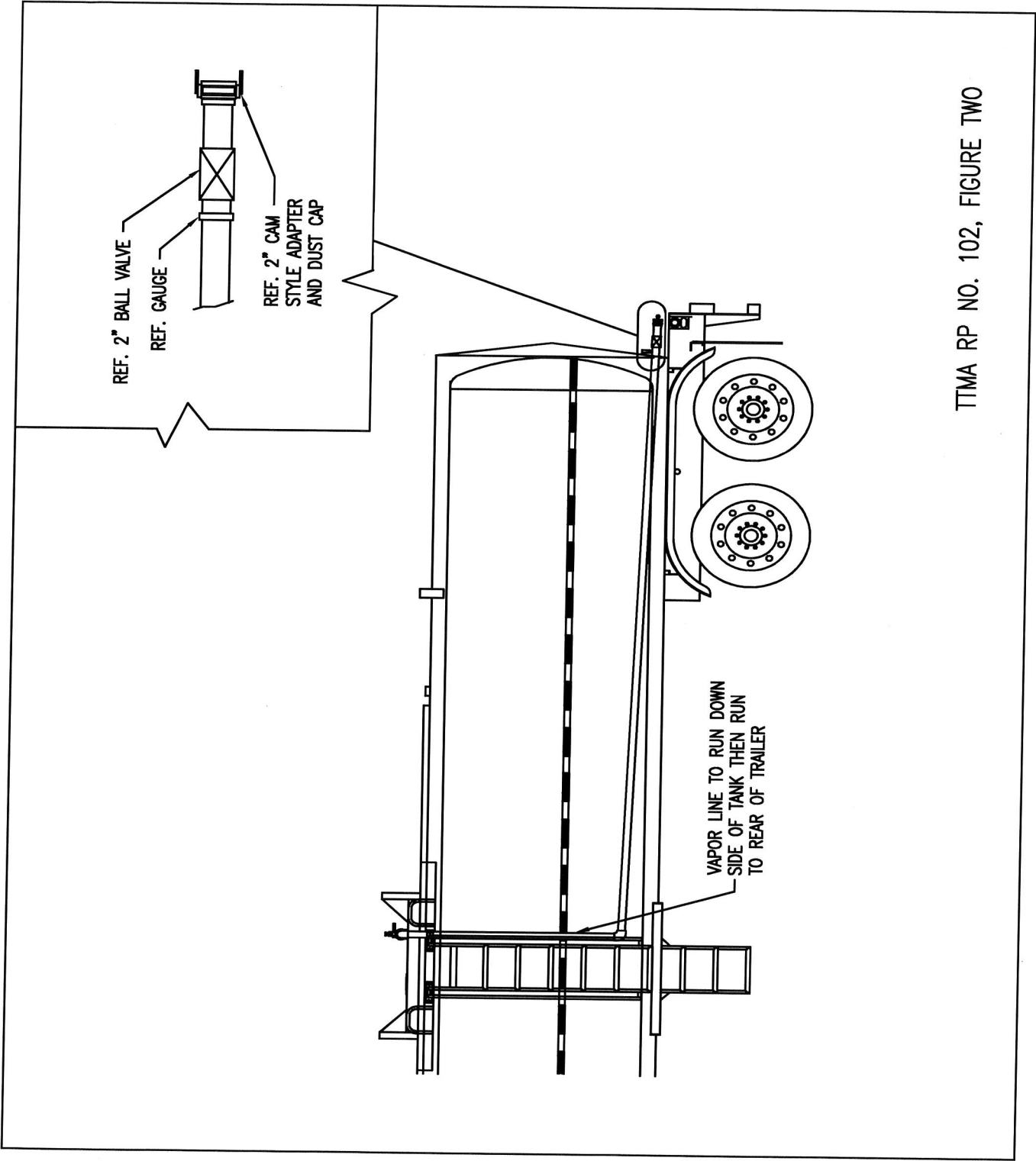
8.0 Appendix

- 8.1 Figure One: Top of Tank
- 8.2 Figure Two: Bottom of Straight Round Tank
- 8.3 Figure Three: Bottom of Double Conical Tank
- 8.4 Figure Four: VR-Valve Standard Dimensions
- 8.5 Figure Five: Optional Hydraulic Plumbing Schematic

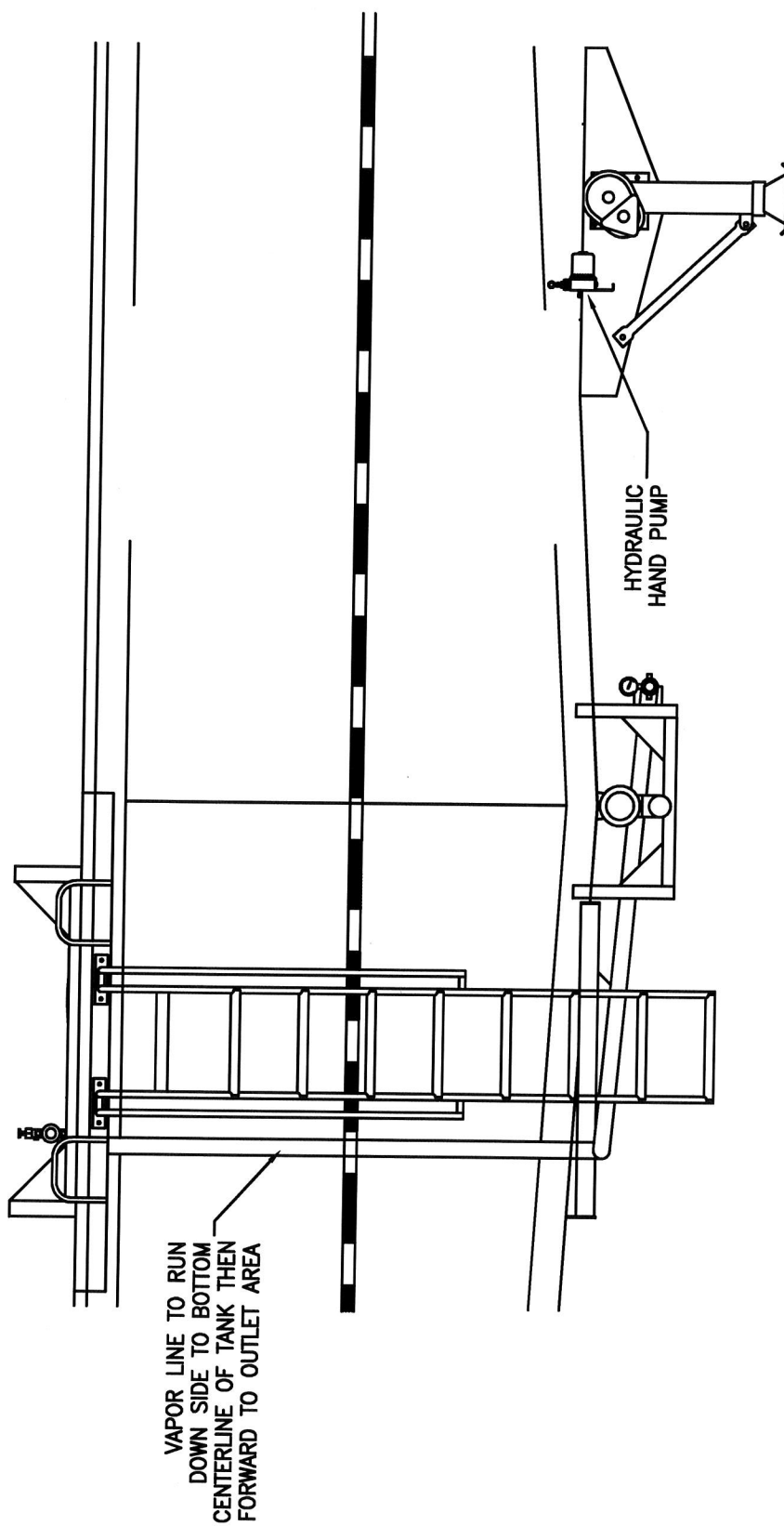


DETAIL "A"

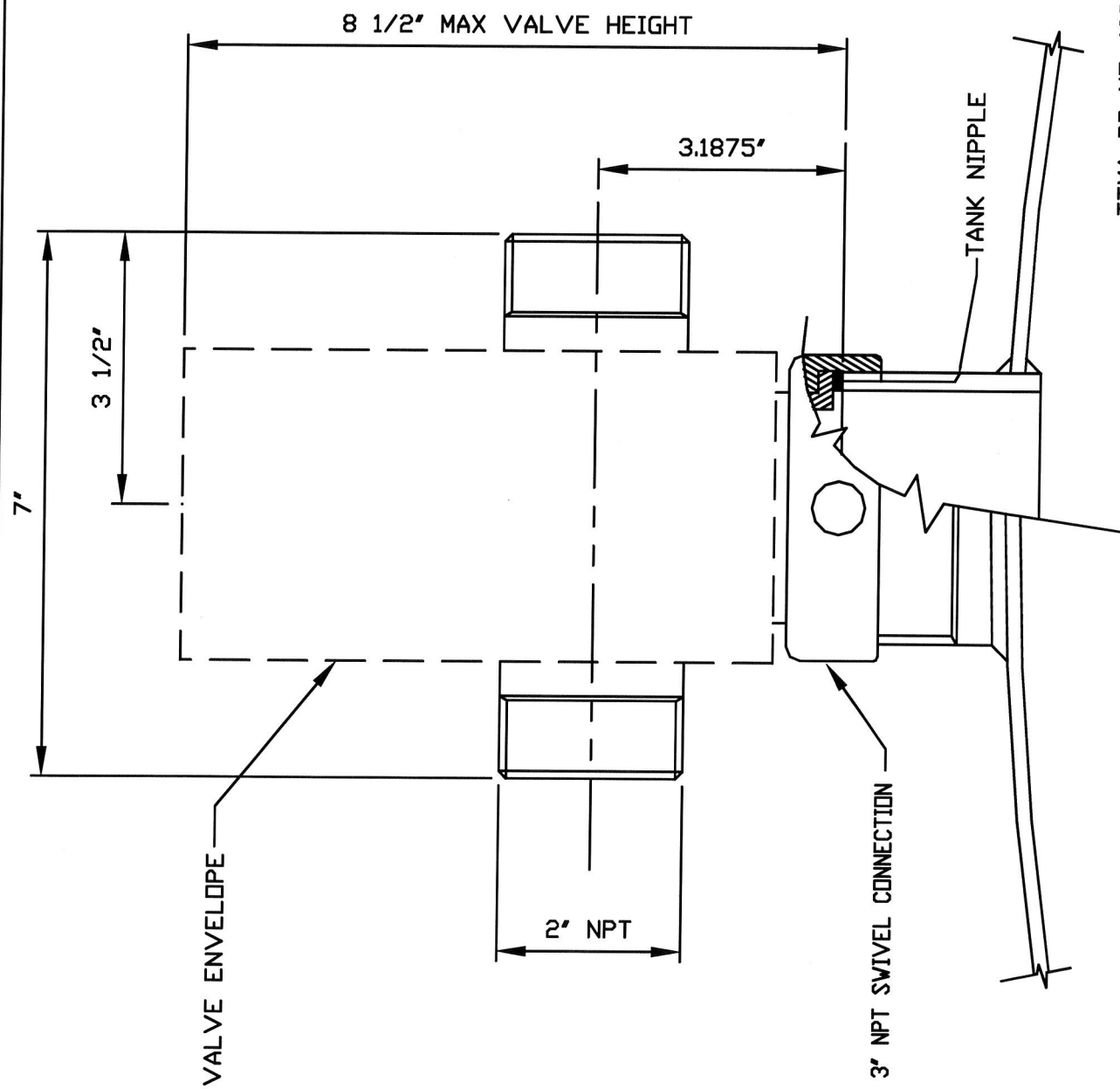
TTMA RP NO. 102, FIGURE ONE



TTMA RP NO. 102, FIGURE TWO



TTMA RP NO. 102, FIGURE THREE



TTMA RP NO. 102, FIGURE FOUR

TEE STYLE HYDRAULICALLY ACTUATED
VAPOR RECOVERY VALVE

HYDRAULICALLY OPERATED
SELF-CLOSING STOP-VALVE

FUSIBLE/FRANGIBLE
REMOTE CONTROL
DEVICE

MANUAL SELECTOR
VALVE WITH INTERNAL
CHECK VALVE

HYDRAULIC
PUMP &
RESERVOIR

WARNING!

CHECK VALVE MUST BE INSTALLED SO THAT HYDRAULIC
PRESSURE CAN BE RELIEVED FROM SELF-CLOSING STOP
VALVE BY ACTUATION OF FUSIBLE/FRANGIBLE EMERGENCY
REMOTE CONTROL DEVICE, EVEN IF MANUAL SELECTOR
VALVE IS CLOSED.

TTMA RP NO. 102, FIGURE FIVE