



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

August 25, 2021

Keenan Moore
Fleet Management Specialist
TCIX Rail
911 NW Loop 281 Suite 316
Longview, TX 75604

Reference No. 21-0054

Dear Mr. Moore:

This letter is in response to your March 26, 2021, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to minimum plate thickness requirements for DOT-111 tank cars. Specifically, you ask what minimum plate thickness should be used when determining the permitted thickness reduction adjustments in accordance with § 180.509 and the Association of American Railroads (AAR) Manual of Standards and Recommended Practices (MSRP) Section C-III Specifications for Tank Cars (M-1002).

You state that you use the minimum plate thickness provided in § 179.201-1 for DOT-111 cars; however, you note that the MSRP has additional thickness requirements listed for tank cars constructed after 2004, based on how the tank car is equipped (e.g., shell material type, jacket, head shield, etc.).

We have paraphrased and answered your questions as follows:

- Q1. You ask what minimum plate thickness should be used when calculating permitted thickness reductions in accordance with the thickness test requirements provided in § 180.509(f).
- A1. For compliance with the HMR, and for tank cars that do not exceed 263,000 pounds gross weight on rail, the thickness values in § 179.201-1 of the HMR must be used to calculate the required minimum tank shell or head thickness, or value “B,” as provided in § 180.509(f). As authorized by the Federal Railroad Administration (FRA), tank cars that have a gross weight on rail up to 286,000 pounds must adhere to the requirements specified in the approval notice titled “Operating Certain Railroad Tank Cars in Excess of 263,000 Pounds Gross Rail Load” (76 FR 4250). Note that the AAR may have additional minimum thickness requirements for the use of interchange railroads. You may use the contact information provided below to confirm AAR’s tank car requirements.

- Q2. In the event that the specifications provided in Chapter 2 of M-1002 must be used as the “required minimum tank shell or head thickness after forming,” you ask whether PHMSA would develop new specification classes that include those additional requirements (e.g., shell material type, jacket, head shield)—similar to what is provided in the specification table provided in § 179.201-1—or if those specifications would become grandfathered requirements that would result in noncompliant cars being phased out as they reach their 50-year end of life period.
- A2. The answer is no. Except for tank cars containing poisonous-by-inhalation material, the requirements for a tank car exceeding 263,000 pounds are currently provided in § 179.13(a). No new specification is needed, as the tank cars built to AAR S-286 meet the DOT specification minimum thickness requirement.
- Q3. You ask whether there would be a difference in the interpretation of the minimum thickness requirements between PHMSA and AAR that might result in noncompliance findings from Bureau of Explosives/ Transportation Technology Center, Inc. (BOE/TTCI) auditors and the FRA to various parties, depending on how they interpret these requirements.
- A3. A PHMSA Letter of Interpretation—such as this letter—is intended to clarify the HMR and is not used to determine compliance with the regulations. Noncompliance findings cannot be determined within the scope of a letter and are not established for tank car specification compliance by this Office. The FRA Tank Car Team, Motive Power and Equipment (MP&E) Division and AAR’s BOE/TTCI auditors should be contacted regarding their individual enforcement policies for a nonconforming tank car. The FRA Tank Car Team can be reached by email at hmassist@dot.gov, and a list of AAR points of contact is available at https://aar.com/standards/boe_contacts.html.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "Dirk Der Kinderen".

Dirk Der Kinderen
Chief, Standards Development Branch
Standards and Rulemaking Division

From: [INFOCNTR \(PHMSA\)](#)
To: [Dodd, Alice \(PHMSA\)](#)
Cc: [Hazmat Interps](#)
Subject: FW: 2004+ 286K DOT-111 Minimum Thickness Question
Date: Wednesday, May 19, 2021 4:55:04 PM
Attachments: [image003.png](#)
[image009.png](#)
[image011.png](#)

Hi Alice,

Please see below for an interpretation request.

Is it possible to assign this request to Leonard Majors or Alex Cheng in PHH-22? They were the primary people spearheading the research in Keenan's question.

Please let me know if you have any questions.

Regards,

-Breanna

From: Keenan Moore [mailto:keenan@trinitychem.com]
Sent: Wednesday, May 19, 2021 1:34 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: RE: 2004+ 286K DOT-111 Minimum Thickness Question

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Breanna,

Please see Physical Mailing address below. Thank you all for your help.

911 NW Loop 281 Suite 316 Longview, Texas 75604

Please & Thank You,



Keenan Moore
Fleet Management Specialist
Keenan@TCIXRail.com
Office: (903) 653-4077
Cell: (903) 241-4079



From: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Sent: Tuesday, May 18, 2021 3:08 PM

To: Keenan Moore <keenan@trinitychem.com>

Subject: RE: 2004+ 286K DOT-111 Minimum Thickness Question

Dear Keenan,

We have received your request for a written letter of interpretation regarding the hazardous materials regulations (49 CFR Parts 171-180). The hazardous materials regulations are available at the following URL:

https://www.ecfr.gov/cgi-bin/text-idx?SID=1d49a3b137cb1b6fc45251074e634b44&tpl=/ecfrbrowse/Title49/49tab_02.tpl

However, before we can submit your request for processing, please respond to this email with:

- Physical Mailing Address

Sincerely,

Breanna, Hazardous Materials Specialist

An e-mail response from this office is considered informal guidance. Formal guidance may be requested in accordance with 49 CFR 105.20. <https://www.phmsa.dot.gov/standards-rulemaking/hazmat/hazardous-materials-information-center>

From: Keenan Moore [<mailto:keenan@trinitychem.com>]

Sent: Friday, March 26, 2021 10:08 AM

To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>

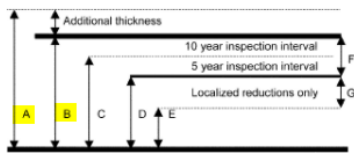
Cc: Fleet Management <fleetmanagement@trinitychem.com>

Subject: 2004+ 286K DOT-111 Minimum Thickness Question

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Breanna,

Please see relevant sections of the CFR and MSRP C-3-Chapter-2 below and attached. My question is what minimum plate thickness should be used when calculating reductions allowed per CFR49.180.509(f). This amounts to what thickness should be used for item "B". Typically, I would use the highlighted column (Minimum plate thickness) below from 179.201-1 (For DOT-111 cars), but MSRP C3-Chapter2-2.5.3, has additional thickness requirements listed for newer (2004+) cars depending on how else the car is equipped (shell material type, jacket, head shield). Are these thicknesses from Chapter 2 to be used in this calculation as item B or should the 179.201-1 table below be used as item B, making the Chapter 2 thickness an item A (overpackaged with additional thickness)?



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Where:

A. As-built tank shell or head thickness with additional thickness.

B. Required minimum tank shell or head thickness after forming per part 179.

A few additional thoughts.

If Chapter 2 is to be used as item B for the calculation, then shouldn't that result in new DOT Specification classes that require those additional requirements (shell material type, jacket, head shield) similarly to the 179.201-1 specification table below specifically the last "References" Column? Or make reference to Chapter 2-2.5.2.3 in 180.509(f) Fig A for a reminder to what minimum plate thickness should be used for certain cars.

Or is this considered a type of grandfathered requirement that will result in noncompliant cars (less than 2004 ordered) being phased out over time as they reach their 50yr EOL? Which would eventually require the 179.201-1 table thickness being revised by 2054 to match the Chapter 2 thickness (for cars that are 286K).

Will there be a difference in opinion between the Feds and the AAR regarding how this is handled, resulting in noncompliance findings (from BOE/TTCI auditors and the FRA) to various parties depending on how they interpret this?

C3-App D-2.1.8.2 Fig.D.1 does not mention Chapter 2 thicknesses and only specifies the 179.201-1 table.

§179.201-1 Individual specification requirements.

In addition to §179.200, the individual specification requirements are as follows:

| DOT Specification ¹ | Insulation | Bursting pressure (psig) | Minimum plate thickness (inches) | Test pressure (psig) | Bottom outlet | Bottom washout | References (179.201 - ***) |
|--------------------------------|----------------------|--------------------------|----------------------------------|----------------------|---------------|----------------|----------------------------|
| 111A60ALW1 | Optional | 240 | $\frac{1}{2}$ | 60 | Optional | Optional | 6(a). |
| 111A60ALW2 | Optional | 240 | $\frac{1}{2}$ | 60 | No | Optional. | |
| 111A60W1 | Optional | 240 | $\frac{7}{16}$ | 60 | Optional | Optional | 6(a). |
| 111A60W2 | Optional | 240 | $\frac{7}{16}$ | 60 | No | Optional. | |
| 111A60W5 | Optional | 240 | $\frac{7}{16}$ | 60 | No | No | 3, 6(b). |
| 111A60W6 | Optional | 240 | $\frac{7}{16}$ | 60 | Optional | Optional | 4, 5, 6(a), 6(c). |
| 111A60W7 | Optional | 240 | $\frac{7}{16}$ | 60 | No | No | 4, 5, 6(a). |
| 111A100ALW1 | Optional | 500 | $\frac{5}{8}$ | 100 | Optional | Optional | 6(a). |
| 111A100ALW2 | Optional | 500 | $\frac{5}{8}$ | 100 | No | Optional. | |
| 111A100W1 | Optional | 500 | $\frac{7}{16}$ | 100 | Optional | Optional | 6(a). |
| 111A100W2 | Optional | 500 | $\frac{7}{16}$ | 100 | No | Optional. | |
| 111A100W3 | Yes | 500 | $\frac{7}{16}$ | 100 | Optional | Optional | 6(a). |
| 111A100W4 | Yes (see 179.201-11) | 500 | $\frac{7}{16}$ | 100 | No | No | 6(a), 8, 10. |
| 111A100W5 | Optional | 500 | $\frac{7}{16}$ | 100 | No | No | 3. |
| 111A100W6 | Optional | 500 | $\frac{7}{16}$ | 100 | Optional | Optional | 4, 5, 6(a) and 6(c). |
| 111A100W7 | Optional | 500 | $\frac{7}{16}$ | 100 | No | No | 4, 5, 6(c). |

¹Tanks marked "ALW" are constructed from aluminum alloy plate; "AN" nickel plate; "CW," "DW," "EW," "W6," and "W7" high alloy steel or manganese-molybdenum steel plate; and those marked "BW" or "W5" must have an interior lining that conforms to §179.201-3.

[Amdt. 179-52, 61 FR 28680, June 5, 1996, as amended by 66 FR 45390, Aug. 28, 2001; 68 FR 48571, Aug. 14, 2003]

(f) *Thickness tests.* (1) The tank car owner must ensure that each tank car facility measures the thickness of the tank car shell, heads, sumps, protective housing (*i.e.*, domes), and nozzles on each tank car by using a device capable of accurately measuring the thickness to within ± 0.05 mm (± 0.002 inch).

(2) The tank car owner must ensure that each tank car has a thickness test measurement:

(i) At the time of an internal coating or lining application or replacement, or

(ii) At least once every ten (10) years for a tank that does not have an internal coating or lining, or

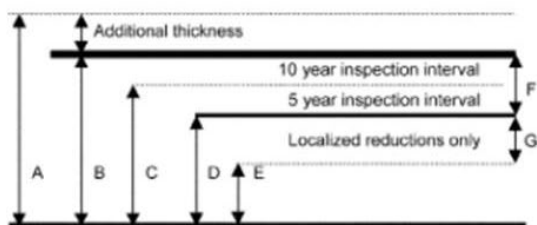
(iii) At least once every five (5) years for a tank that does not have an internal coating or lining when:

(A) The tank is used to transport a material that is corrosive or reactive to the tank (see Appendix D of this part) or service equipment as defined §180.503, and

(B) The remaining shell and head thickness is tested and determined to be at or below line C in Figure A of this paragraph.

Figure A

Tank and Shell Thickness Qualification Frequencies



[View or download PDF](#)

Where:

A. As-built tank shell or head thickness with additional thickness.

B. Required minimum tank shell or head thickness after forming per part 179.

C. Inspection frequency adjustment point (design minimum shell or head thickness, minus $\frac{1}{2}$ of the table value in paragraph (g) of this section).

D. Condemning limit for general corrosion (required minimum shell or head thickness, minus the value in paragraph (g) of this section).

E. Condemning limit for localized corrosion (required minimum shell or head thickness, minus the table value in paragraph (g) of this section, minus 1.58 mm ($\frac{1}{16}$ inch)). See Note 1 in paragraph (g) of this section for diameter limitations and minimum separation distances.

F. Allowable shell or head thickness reduction (table value in paragraph (g) of this section).

G. Additional thickness reduction for localized areas in paragraph (g) of this section.

2.5 Requirements for DOT/TC Tank Cars Weighing Over 263,000 lb GRL

2.5.1 All Class DOT/TC Tank Cars

Paragraph 2.5 applies to all Class DOT and TC tank cars ordered after December 31, 2003, when the gross weight exceeds 263,000 lb.

2.5.1.1 Cars must comply with all requirements of the *Office Manual of the AAR Interchange Rules*, latest version.

2.5.1.1.1 Cars must be in conformance with the truck requirements located in *MSRP* Standard S-286 as required in the *Office Manual of the AAR Interchange Rules*, Rule 88.

2.5.1.2 Shippers are reminded that regulations limit the gross weight of Class DOT/TC tank cars to 263,000 lb and that a federal exemption is required to operate these cars at heavier weights.

2.5.1.3 In addition to the design loads described in *MSRP* S-286, all REPOS loading, including horizontal and vertical coupler loads, used for fatigue calculations must be increased by a factor of 1.09 above the loading used for 263,000 lb cars.

2.5.1.4 Car owner must identify appropriate areas of inspection for fatigue, corrosion, wear, etc., and must have a "life-cycle" maintenance plan for cars. This must identify inspection items, inspection methods, acceptance criteria, and inspection frequencies. The car owner or designee must have written procedures that ensure that work performed on cars conforms to federal and AAR requirements.

2.5.1.5 New cars may not be equipped with reconditioned truck components.

2.5.1.6 Class DOT/TC cars with tanks constructed of aluminum or nickel plate with gross weight over 263,000 lb are not authorized.

2.5.2 Class DOT/TC-111 Nonpressure Tank Cars

2.5.2.1 Class DOT/TC-111 cars must be equipped with top fittings protection in accordance with Appendix E, paragraph 9.2.

2.5.2.2 Class DOT/TC-111 cars must be equipped with reclosing pressure relief devices, except where the applicant can demonstrate that a non-reclosing device affords an equivalent level of safety.

2.5.2.3 Class DOT/TC-111 cars with carbon steel tanks must meet one of the following minimum criteria:

- Tanks are constructed of normalized TC128 steel at least 7/16 in. thick and equipped with steel jackets and 1/2 in. thick steel jacket heads.
- Tanks are constructed of normalized TC128 steel at least 1/2 in. thick and equipped with 1/2 in. thick steel half-head shields.
- Tanks are constructed of normalized ASTM A516 steel at least 1/2 in. thick and equipped with steel jackets and 1/2 in. thick steel jacket heads.
- Tanks are constructed of normalized ASTM A516 steel at least 5/8 in. thick and equipped with 1/2 in. thick steel half-head shields.

2.1.8 Thickness Tests

2.1.8.1 When required, each *tank car facility* shall measure the thickness of the shell, heads, sumps, domes, and nozzles on each *tank car* by using a device capable of accurately measuring the thickness to within ± 0.002 in. (± 0.05 mm).

2.1.8.2 Each *tank car* tank shall have a thickness test measurement

- at least once every 10 years for non-lined/coated cars; or
- prior to the application of an internal lining or internal coating.

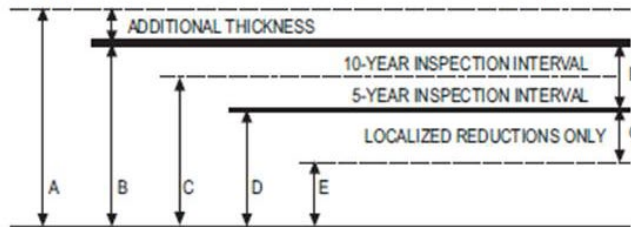


Fig. D.1 Tank shell thickness qualification frequencies

where

- A = As-built tank shell thickness, with additional thickness.
- B = Required minimum tank shell or head thickness after forming per Part 179 (see Appendix X, parts 179.100-6, 179.200-6, 179.101-1, 179.201-1, etc.).
- C = Inspection frequency adjustment point (required minimum shell or head thickness, minus 1/2 of the table value in paragraph 2.1.9 below).
- D = Condemning limit for general corrosion (required minimum shell or head thickness, minus the table value in paragraph 2.1.9 below).
- E = Condemning limit for localized corrosion [required minimum shell or head thickness, minus the table value in paragraph 2.1.9 below, minus 1/16 in. (1.58 mm)]. See Note 1 in paragraph 2.1.9 below for diameter limitations and minimum separation distances.
- F = Allowable shell thickness reduction (table value in paragraph 2.1.9 below).
- G = Additional thickness reduction for localized areas.

IMPLEMENTED 03/2021

Please & Thank You,



Keenan Moore

Fleet Management Specialist

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