U.S. Department
of Transportation
**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

July 28, 2022

Mr. David J. Adams
Director of Design Engineering
Betts Industries, Inc.
1800 Pennsylvania Ave W.
Warren, PA 16365

Reference No. 22-0011

Dear Mr. Adams:

This letter is in response to your February 23, 2022, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the venting capacity of pressure relief systems for cargo tanks, specified in § 178.345-10(e). You state that "Table 1 - Minimum Emergency Vent Capacity" in paragraph (e) includes a note which allows for interpolation of the values on the table for intermediate sizes of cargo tanks, specifically exposed area in square feet. However, you note that it is not stated whether one can extrapolate the data on the table for cargo tanks larger than 1,000 square feet. You have provided an additional table showing data that you have interpolated and extrapolated from Table 1 in § 178.345-10(e). Lastly, you state that you are not aware of any regulation which limits the size of a cargo tank to less than 1,000 square feet of exposed area.

We have paraphrased and answered your questions as follows:

Q1. You ask whether there is any regulation that limits the size of a cargo tank to being no greater than 1,000 square feet of exposed area.

A1. Although the HMR do not limit the size of a cargo tank, the Federal Highway Administration (FHWA) regulates commercial vehicle weight and size requirements, in conjunction with state enforcement agencies. More information on the federal commercial vehicle size and weight program can be found on FHWA's website at the following web address: https://ops.fhwa.dot.gov/freight/sw/overview/index.htm.

Q2. You ask what venting capacity is required if the cargo tank has an exposed area of greater than 1,000 square feet.

A2. As you have stated in your email, the table for minimum emergency vent capacity in § 178.345-10(e) does not have a corresponding value for cargo tanks with an exposed area of greater than 1,000 square feet. It is the opinion of this Office that for cargo tanks with greater than 1,000 square feet of exposed area, extrapolation would be acceptable to determine the value of the cubic feet free air per hour. However, the extrapolation calculation should be verified by the Design Certifying Engineer responsible for determining compliance of the cargo tank design.

Q3. You ask whether extrapolation of the data from Table 1 in § 178.345-10(e) is permitted.

A3. Please see answer A2.

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

Sincerely,

T. Glenn Foster

T. Glenn Foster
Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division

Larson

22-0011

From: Raynor, T"Mia (PHMSA)
To: Hazmat Interps
Subject: FW: Request for Interpretation 49CFR§178.345-10
Date: Wednesday, February 23, 2022 1:49:20 PM
Attachments: image003.png

Good Afternoon,

Would someone be able to assist the user below?

Thanks,

T'Mia Raynor
Webmaster, Office of the PHMSA CIO
US Department of Transportation
Pipeline and Hazardous Materials Safety Administration
1200 New Jersey Ave. SE, Washington, D.C., 20590
Office: 202.366.9818 ◊ Mobile: 202.580.9447

PHMSA Home | LinkedIn | Twitter | HAZMAT | OPS

From: David J. Adams <dadams@bettsind.com>
Sent: Wednesday, February 23, 2022 12:54 PM
To: PHMSA Website Manager <PHMSAWebsiteManager@dot.gov>
Subject: Request for Interpretation 49CFR§178.345-10

To Whom It May Concern,

I would like to request a regulation interpretation or clarification.

Current regulation reads:

> 49 CFR 178.345 10(e) ***Venting capacity of pressure relief systems.*** The pressure relief system (primary and secondary, including piping) must have sufficient venting capacity to limit the cargo tank internal pressure to not more than the cargo tank test pressure. The total venting capacity, rated at not more than the cargo tank test pressure, must be at least that specified in table I, except as provided in § 178.348-4.
>
> Table I - Minimum Emergency Vent Capacity
> [In cubic feet free air/hour at 60 °F and 1 atm.]

Exposed area in square feet	Cubic feet free air per hour
20	15,800
30	23,700
40	31,600
50	39,500

60	47,400
70	55,300
80	63,300
90	71,200
100	79,100
120	94,900
140	110,700
160	126,500
180	142,300
200	158,100
225	191,300
250	203,100
275	214,300
300	225,100
350	245,700
400	265,000
450	283,200
500	300,600
550	317,300
600	333,300
650	348,800
700	363,700
750	378,200
800	392,200
850	405,900
900	419,300
950	432,300
1,000	445,000

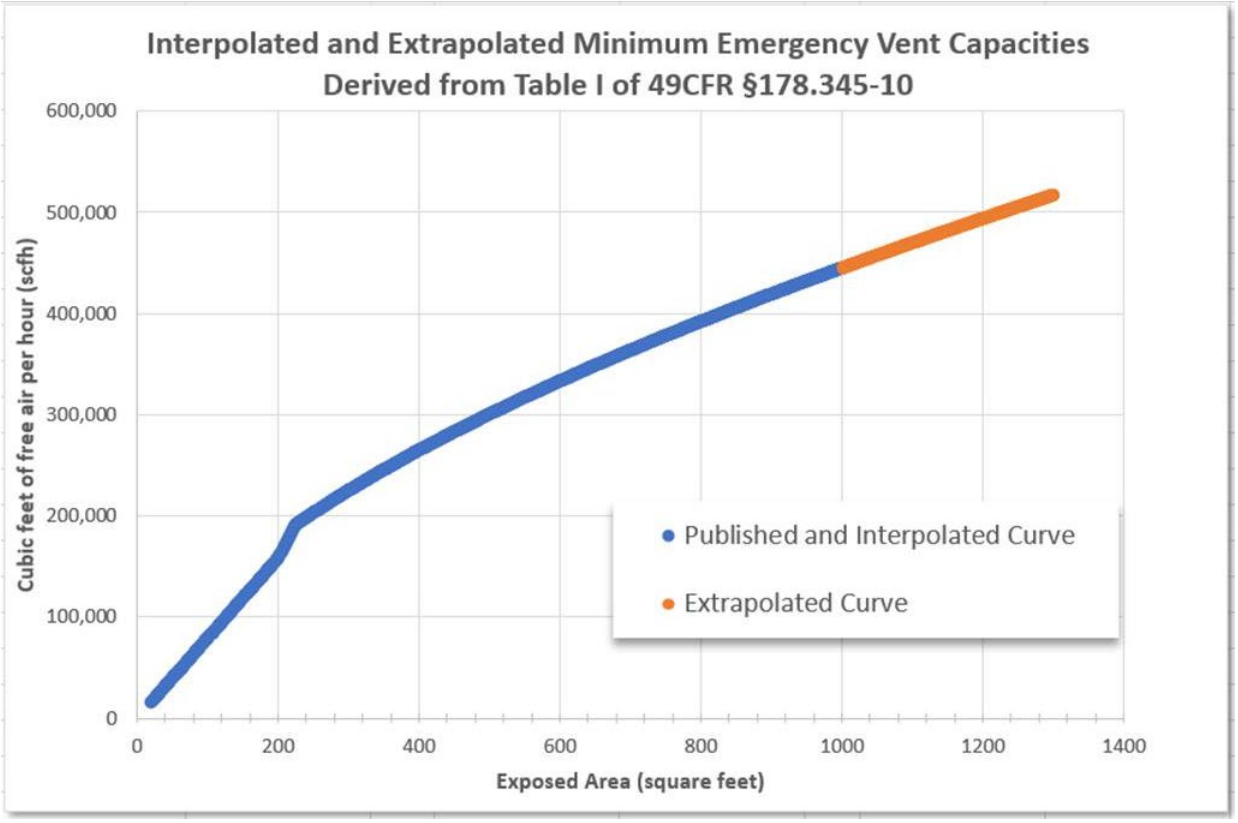
Note 1: Interpolate for intermediate sizes.

This table includes note 1 which allows for interpolation for intermediate sizes but it does not mention if extrapolation is permitted for larger size cargo tanks. I am not aware of any regulation which limits the size of a cargo tank to under 1,000 square feet of exposed area.

The specific questions are:

1. Is there any regulation limiting the size of a cargo tank (specially a specification DOT406) to no greater than 1,000 square feet of exposed area?
2. What venting capacity is required if the cargo tank has exposed area greater than 1,000 square feet?
3. Is extrapolation of Table 1 permitted? (An example of extrapolated data is provided in Appendix A.)

Appendix A – Example of extrapolated capacity curve based off Table 1 of 49 CFR 178.345 10.



Exposed Area (sq. ft.)	Req. Vent Capacity (scfh)
20	15,800
40	31,600
80	63,300
100	79,100
120	94,900
140	110,700
160	126,500
180	142,300
200	158,100
225	191,300
250	203,100
275	214,300
300	225,100
325	235,400
350	245,700
375	255,350
400	265,000
425	274,100

Exposed Area (sq. ft.)	Req. Vent Capacity (scfh)
450	283,200
475	291,900
500	300,600
525	308,950
550	317,300
575	325,300
600	333,300
625	341,050
650	348,800
675	356,250
700	363,700
725	370,950
750	378,200
775	385,200
800	392,200
825	399,050
850	405,900
875	412,600

Exposed Area (sq. ft.)	Req. Vent Capacity (scfh)
900	419,300
925	425,800
950	432,300
975	438,650
1000	445,000
Exposed Area	**Extrap. Cap.**
1,025	451,275
1,050	457,550
1,075	463,700
1,100	469,850
1,125	475,900
1,150	481,950
1,175	487,900
1,200	493,850
1,225	499,725
1,250	505,600
1,275	511,375
1,300	517,150

Thank you for your time and consideration.

Best regards,

David J. Adams
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Betts Industries, Inc.
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