



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

January 13, 2025

Travis Alley
Engineering Manager
Infinite Composites, Inc.
10738 E. 55th Pl.
Tulsa, OK 74146

Reference No. 24-0081

Dear Mr. Alley:

This letter is in response to your September 4, 2024, email and subsequent conversations with members of our staff requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to International Organization for Standardization (ISO) standards for pressure vessels. Specifically, you ask whether an ISO pressure vessel is permitted to exceed its working pressure due to environmental conditions, and whether testing parameters can be altered to reflect the expected environmental conditions.

We have paraphrased and answered your questions as follows:

- Q1. You ask whether a pressure vessel designed and tested in accordance with the ISO 11119-3:2013 standard is permitted to exceed its working pressure when exposed to extreme temperatures while held in storage after the pressure vessels are no longer in transportation.
- A1. For the purposes of the HMR, the answer is yes as long as the pressure vessel is not in storage incidental to transportation. The HMR apply to activities that involve the transportation of hazardous materials, and the loading, unloading, or storage of hazardous materials incidental to transportation. Therefore, during transportation, § 173.301(a)(8) requires that a cylinder's internal pressure at 55 °C (131 °F) may not exceed 5/4 of the service pressure of the cylinder and that the cylinder will not be liquid full at 55 °C (131 °F). However, provided that the pressure vessel has been designed, filled, and maintained in accordance with the HMR, there is no requirement that prevents the pressure vessel from experiencing increased pressures due to fluctuating ambient temperature when that pressure vessel has been placed in storage that is not incidental to a transportation.

We encourage you to look at other regulatory bodies for storage requirements such as the Occupational Safety and Health Administration, the U.S. Environmental Protection Agency, the Department of Defense, and state entities. We also encourage you to avoid subjecting a pressure vessel to temperatures in excess of the design parameters.

Q2. You ask whether the ambient cycle test in section 8.5.4.1 of the ISO 11119-3:2013 standard can be performed with a modified p_{\max} calculation that reflects the expected temperature of 75 °C rather than the prescribed temperature of 65 °C.

A2. The answer is no. ISO specification pressure vessels must be constructed and tested in accordance with their respective Standard. In the case of the ISO 11119-3:2013 Standard, the Ambient Cycle test in section 8.5.4.1 must be followed as written with the p_{\max} calculated based on a temperature of 65 °C.

However, if you wish to deviate from the design qualification testing requirements you may, in accordance with § 107.105, apply for a special permit to manufacture, mark, and sell a pressure vessel that is based on ISO 11119-3:2013, but for which p_{\max} is measured at 75 °C. Please note that a pressure vessel manufactured under a special permit would be marked as a Department of Transportation Special Permit cylinder, not as an ISO pressure vessel.

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 'S. Andrews'.

Steven Andrews
Acting Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division

From: [INFOCNTR \(PHMSA\)](#)
To: [Dodd, Alice \(PHMSA\)](#)
Cc: [Hazmat Interps](#)
Subject: FW: Request for Letter of Interpretation (ISO 11119-3:2013)
Date: Friday, September 6, 2024 11:26:13 AM
Attachments: [PHMSA Request of Interpretation \(9-4-24\) .pdf](#)

Hello Alice,

Please see the attached interpretation request. Let us know if you need anything.

Sincerely,
Janaye

From: Travis Alley <talley@infinitecomposites.com>
Sent: Wednesday, September 4, 2024 2:36 PM
To: PHMSA HM InfoCenter <PHMSAHMInfoCenter@dot.gov>
Cc: Moore, Brian (PHMSA) <Brian.Moore@dot.gov>; Clark, Kenneth (PHMSA) <kenneth.clark@dot.gov>; Branden Cattanach <Branden.Cattanach@karman-systima.com>; Michael Tate <mtate@infinitecomposites.com>; Benjamin Roper <broper@infinitecomposites.com>; Jared Cuneo <jcuneo@infinitecomposites.com>
Subject: Request for Letter of Interpretation (ISO 11119-3:2013)

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Good Afternoon PHMSA Team,

I am writing to request a letter of interpretation for ISO 11119-3:2013. I have attached a PDF, which includes the specific questions we have. I am hoping to be able to provide a letter of support from the Navy in the near future to hopefully expedite the process. Please let me know if you have any questions, concerns, or further requirements/documentation to expedite this process.

Travis Alley
Engineering Manager
Infinite Composites
(918) 637-1043



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September 4, 2024

Attn: Mr. Shane Kelley
Director, Standards and Rulemaking Division
U.S. DOT/PHMSA (PHH-10)
1200 New Jersey Avenue, SE East Building, 2nd Floor
Washington, DC 20590

RE: Request of interpretation regarding ISO 11119-3.

Mr. Kelley,

We are designing a vessel containing Nitrogen with an intended working pressure of 8ksi and a maximum developed pressure of 10ksi at 75c. This maximum developed pressure will be experienced exclusively during storage of the bottle on hot days at an unconditioned facility.

In regards to the ISO 11119-3:2013 standard, there is no clear direction as to the acceptance/presence of Maximum Developed Pressure (Pmax). Section 8.5.4.1, ambient cycle test for a cylinder with dedicated gas, makes provisions for testing to a pressure equal to Pmax at 65c, however does not advise as to whether or not the vessel is permitted ever to exceed working pressure into this range during its lifetime.

Seeing as ISO 11119-3 has recognized vessels may/will experience a pressure exceeding working pressure resulting from an increase in temperature and has made testing provisions for this, Infinite Composite's interpretation is that the bottle can be certified and stamped to a working pressure of 8ksi and permitted to develop a pressure not to exceed a pressure of Pmax during storage. This developed pressure would still have a safety factor greater than 2.4. If the working pressure is increased to 10ksi, then the working pressure and evaluated Pmax would greatly exceed that of the actual expected conditions.

First and foremost, ignoring the discrepancy in the temperature used to evaluate the maximum developed pressure, if we qualify this bottle with a working pressure of 8ksi is it permissible for the vessel to develop a pressure exceeding the working pressure to that of Pmax evaluated at 65c while in storage?

Secondly, if the answer to the question above is yes, are we permitted to perform the ambient cycle testing outlined in 8.5.4.1 to a Pmax evaluated at 75c? If so we assume this falls under special permitting.

In consideration of this information please provide an official answer regarding the aforementioned interpretation of ISO 1111-3:2013.

Regards,

Travis Alley
Engineering Manager