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

1200 New Jersey Avenue, SE
Washington, DC 20590

March 26, 2025

Rachael Gunaratnam
Hazardous Materials Accident Investigator
Office of Railroad, Pipeline and Hazardous Materials Investigations
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594

Reference No. 24-0082

Dear Ms. Gunaratnam:

This letter responds to the September 11, 2024 letter that you submitted on behalf of the National Transportation Safety Board (NTSB). In that letter, NTSB asks the Office of Hazardous Materials Safety (OHMS) to clarify the requirements in the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) that apply to the bulk transport by vessel of lithium batteries that are installed in a battery energy storage system (BESS). NTSB's understanding is that the requirements in special provision (SP) 389 apply to "UN3536, Lithium batteries installed in cargo transport unit" because the BESS is a freight container that meets the definition of a cargo transport unit (CTU) under the HMR. Based on that understanding, NTSB presents a series of questions to OHMS about the applicability of certain requirements in the HMR to the BESS.

OHMS has paraphrased and answered your questions as follows:

Q1. What are the performance criteria or specifications for a freight container used as a CTU when transporting "UN3536, Lithium batteries installed in cargo transport unit"?

A1. A freight container meets the definition of a CTU under the HMR. As noted in your letter, a CTU is defined, in relevant part, as "a transport vehicle, a freight container, a portable tank or a multiple element gas container." 49 CFR § 176.2. A freight container is "a reusable container having a volume of 64 cubic feet or more, designed and constructed to permit being lifted with its contents intact and intended primarily for containment of packages (in unit form) during transportation." 49 CFR § 171.8. Additional performance criteria, as provided in SP 389 and assigned to the UN3536 entry in the Hazardous Materials Table, states that "the batteries must be securely attached to the interior structure of the cargo transport unit (*e.g.*, by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and

significant movement relative to the cargo transport unit under the shocks, loadings, and vibrations normally incident to transport." 49 CFR § 172.102(c)(1)(389).

Q2. If the cabinet used for the BESS described in NSTB's letter is a freight container that meets the definition of a CTU under the HMR, which standards or specifications apply when a CTU is used to transport "UN3536, Lithium batteries installed in cargo transport unit" by vessel or highway?

A2. The cabinet described in NTSB's letter that houses the BESS is a freight container that meets the definition of a CTU as defined in the HMR. See 49 CFR § 176.2. There are requirements in the HMR for CTUs such as the one in the BESS described. See answer A1 for the relevant performance criteria in SP 389.

Q3. Is a "high sea state" with significant speed winds and wave heights considered normal conditions for the transportation of hazardous materials by vessel?

A3. The HMR do not specifically define conditions normally incident to transportation; however, a "high sea state" refers to rough and potentially dangerous ocean conditions with large waves, typically caused by strong winds or storms. While it is not unreasonable for a vessel to expect to encounter such rough seas during an ocean crossing, depending on the severity of the storm, such conditions may be considered abnormal.

Q4. Does the fact that the air conditioning system for a BESS is not energized during transportation imply that such a system is not "necessary for the safe and proper operation of the cargo transport unit" under SP 389 and the HMR?

A4. No. The mere fact that the air conditioning system for a BESS is not operating in transportation does not mean that such a system is not necessary for the safe and proper operation of the CTU in accordance with SP 389 and the HMR. An air conditioning system could be necessary for the safe and proper operation of the CTU if the BESS is in operation and actively providing power external to the CTU. The fact that the system is not operational during transportation would not affect the compliance obligations imposed under SP 389 and the HMR. If, on the other hand, an air conditioning system is only used for purposes other than the safe and proper operation of the CTU, the standard prescribed in SP 389 and the HMR would not be met. In this case, the air conditioning system must not be transported within the CTU.

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

Sincerely,

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

Larson

24-0082

From: INFOCNTR (PHMSA)
To: Hazmat Interps
Subject: FW: NTSB request for a letter of interpretation
Date: Friday, September 13, 2024 12:56:28 PM
Attachments: NTSB request Letter of Interpretation final.pdf

Hello Hazmat Interps,

Please see attached request for letter of interpretation.

Thanks,
Jonathon, HMIC

From: Rachael Gunaratnam <rachael.gunaratnam@ntsb.gov>
Sent: Thursday, September 12, 2024 1:29 PM
To: PHMSA HM InfoCenter <PHMSAHMInfoCenter@dot.gov>
Cc: Kelley, Shane (PHMSA) <shane.kelley@dot.gov>; DerKinderen, Dirk (PHMSA) <Dirk.DerKinderen@dot.gov>; Robert Clatterbuck <Robert.Clatterbuck@ntsb.gov>; David Flaherty <david.flaherty@ntsb.gov>
Subject: NTSB request for a letter of interpretation

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.

Good Afternoon,

Please see the attached request for a letter of interpretation regarding the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180).

Thank you,

Rachael Gunaratnam
Hazardous Materials Accident Investigator
Office of Railroad, Pipeline and Hazardous Materials Investigations
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, D.C. 20594

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National Transportation Safety Board

Office of Railroad, Pipeline and Hazardous Materials

Washington, DC 20594

September 11, 2024

U.S. Department of
Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

To whom it may concern,

I am requesting a letter of interpretation regarding the regulations that apply to bulk transport of UN 3536 lithium battery shipments of a battery energy storage system (BESS) by vessel. Currently, PHMSA regulations, similar to the International Maritime Dangerous Goods Code for international shipments, requires special provision 389 for UN 3536, "Lithium batteries installed in cargo transport unit." Special provision 389 under 49 CFR 172.102 states:

> This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit. The lithium batteries must meet the requirements of § 173.185(a) and contain the necessary systems to prevent overcharge and over discharge between the batteries. The batteries must be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings, and vibrations normally incident to transport. Hazardous materials necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), must be properly secured to or installed in the cargo transport unit and are not otherwise subject to this subchapter. Hazardous materials not necessary for the safe and proper operation of the cargo transport unit must not be transported within the cargo transport unit. The batteries inside the cargo transport unit are not subject to marking or labelling requirements of part 172 subparts D and E of this subchapter. The cargo transport unit shall display the UN number in a manner in accordance with § 172.332 of this subchapter and be placarded on two opposing sides. For transportation by aircraft, cargo transport units may only be offered for transportation and transported under conditions approved by the Associate Administrator.

A cargo transport unit under 49 CFR 176.2 is defined as:

> A cargo transport unit means a transport vehicle, a freight container, a portable tank or a multiple element gas container (MEGC). A *closed cargo transport unit* means a cargo transport unit in which the contents are totally enclosed by permanent structures. An *open cargo transport unit* means a cargo transport unit that is not a closed cargo transport unit. Cargo transport units with fabric sides or tops are not closed cargo transport units for the purposes of this part.

I am requesting clarification on the following:

1) As defined under Part 176.2, a CTU is a transport vehicle, freight container, portable tank and multiple element gas container. For a UN 3536 BESS, only a freight container would apply and is defined under PHMSA regulations under Part 171.8:

   Freight container means a reusable container having a volume of 64 cubic feet or more, designed and constructed to permit being lifted with its contents intact and intended primarily for containment of packages (in unit form) during transportation.

   Is there performance packaging or specifications for a CTU/freight container for a UN 3536 lithium battery that is shipped by vessel or highway? If yes, what is the standard?

2) The NTSB is currently investigating an incident involving a Battery Energy Storage Segment (BESS). A similar model of the BESS involved in the incident is illustrated in PHMSA's letter of interpretation Reference No. 22-0131, as seen below in Figure 1. The NTSB would like clarification if the cabinet that housed the lithium ion batteries is considered a cargo transport unit. If the cabinet itself is a CTU, what performance criteria must be met before the cabinet is transported by vessel or highway?

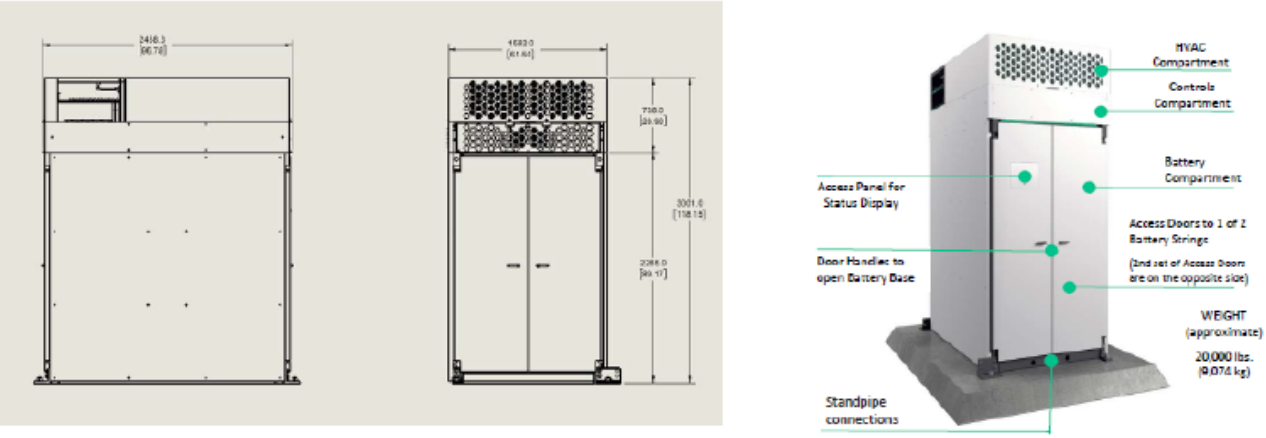

Figure 1: Exemplar Model of a BESS

3) When shipping a hazardous materials package by sea, the vessel may encounter a high sea state with significant speed winds and wave heights.[1] Is a high sea state, such as gale force conditions, considered normal conditions of transportation by vessel?

4) Special Provision 389 notes the following:

   "Hazardous materials necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), must be properly secured to or installed in the cargo transport unit and are not otherwise subject to this subchapter".

   The cargo transport units referenced above were equipped with an air conditioning system that was not energized during shipment. Since the system was not energized during shipment, would that imply that the air conditioning system was not "necessary for the safe and proper operation" of the cargo transport unit?

Sincerely,

Rachael Gunaratnam
Sr. Hazardous Materials Investigator
National Transportation Safety Board

cc: LT Joshua Murdy, U.S. Coast Guard

[1] See "Beaufort Wind Scale", Storm Prediction Center, NOAA/National Weather Service, https://www.spc.noaa.gov/faq/tornado/beaufort.html.