



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

1200 New Jersey Avenue, SE
Washington, DC 20590

January 9, 2023

Mr. Thomas Kerr
Program Manager
Powin
20550 SW 115th Ave
Tualatin, OR 97062

Reference No. 22-0131

Dear Mr. Kerr:

This letter is in response to your December 6, 2022, email and letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to use of hazardous materials (HM) description “UN3536, Lithium batteries installed in cargo transport unit” and the associated use of the term cargo transport unit (CTU) as it relates to this HM description.

You state that your company has designed and manufactured a power storage unit called the Powin Stack750 Centipede Energy Segment. This unit contains lithium batteries with a maximum energy capacity of 750 kWh per segment, and weighs 20,000 lbs. You also state that the unit includes a fully-integrated direct current block, independent sensors (i.e., gas and temperature), and a fire suppression system. Finally, you provide diagrams that demonstrate during vessel, rail, and highway transportation, the unit would be secured to either a truck-trailer, flat-rack, roll-on / roll-off, or bulk freight configuration. Your company is seeking clarification that the unit secured to a flat-rack, roll-on / roll-off, truck-trailer, or as bulk-freight meets the transportation requirements and is appropriately described and classed using UN3536.

Based on the information and illustrations provided, it is the opinion of this Office that the Stack750 Centipede Energy Segment secured to a flat-rack, roll-on / roll-off, truck-trailer, or as bulk-freight is appropriately described and classed, as “UN3536,

Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries*, 9” and meets the transportation requirements of special provision 389 assigned to the HM description.

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". The signature is fluid and cursive, with a prominent initial "D".

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

Baker
22-0131

From: [INFOCNTR \(PHMSA\)](#)
To: [Dodd, Alice \(PHMSA\)](#)
Cc: [Hazmat Interps](#)
Subject: FW: UN3536 Cargo Transport Unit (CTU) Definition
Date: Thursday, December 8, 2022 1:58:10 PM
Attachments: [image001.png](#)
[DOT Letter of Interpretation.pdf](#)

Hi Alice,

Please see the attached interpretation request.

Let us know if you need anything.

Regards,

-Breanna

From: Thomas Kerr <thomas.kerr@powin.com>
Sent: Tuesday, December 6, 2022 6:12 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: UN3536 Cargo Transport Unit (CTU) Definition

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.

Breonna.

Thank you for your time to discuss UN3536 Cargo Transport Unit Definition. As requested, please find my Letter of Interpretation request.

I look forward to your response,

Best regards,

Thomas



Thomas Kerr
Program Mgr - NPI
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TO

November 30, 2022

U.S. Department of Transportation

1200 New Jersey Ave, SE, Washington, DC 20590

FROM

Thomas Kerr
Program Manager
Powin

Re: Letter of Interpretation for UN3536 definition of Cargo Transport Unit.

To whom it may concern,

Powin, a designer and manufacturer of the Stack750™ Centipede™ Energy Segment utility-scale [Power Storage Units](#), is requesting interpretation of UN3536's definition of Cargo Transport Unit (CTU). The interpretation would include transport by vessel, rail, and highway. It is Powin's goal for the *Letter of Interpretation* to record that a Stack750 Centipede Energy Segment secured to a CTU meets the requirements of UN3536, and to synchronize those results across the UN, IMO, and other associated international bodies.

The Powin Stack750 Centipede Energy Segment's maximum energy capacity is 750 kWh DC per segment, and weighs 20,000 pounds. The cabinets dimensions are roughly 10'H x 6'W x 8'L and have an ISO block in each of the four lower corners that serve as hoist attachment points. See Figure 1 below.

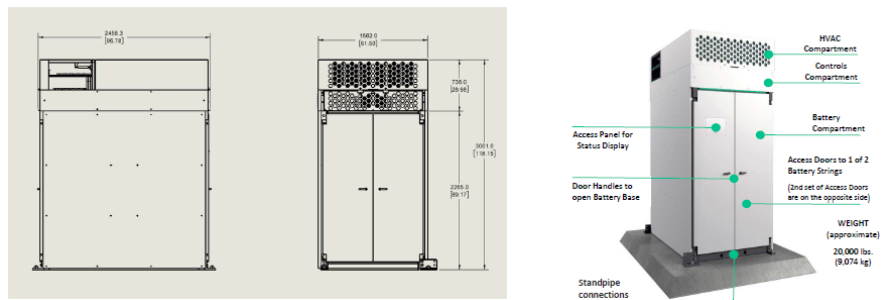


Figure 1 Powin Stack750 Centipede

The Powin Stack750 Centipede Energy Segment is comprised of state-of-the-art modular and scalable architecture. This includes a fully integrated DC block, independent sensors (gas & temperature) and a fire suppression system. It is capable of supporting commercial & industrial projects up to and including large utility-scale projects. The internal batteries are secured via racks and are cooled by an air conditioning system.

The Energy Segment meets the requirement of UNDG ref [1] section 2.9.4 and has been tested to UN1973 to evidence compliance. Cells and battery packs have both been tested to UN38.3.



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The cabinet is secured per Figure 2 when loaded on a tractor trailer for highway transport.

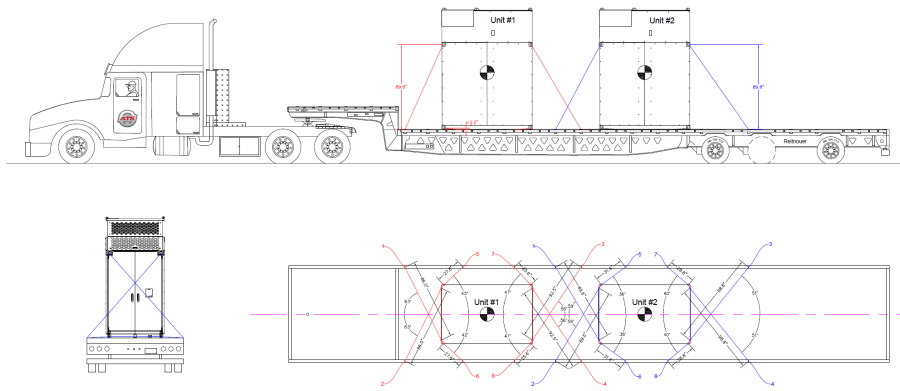


Figure 2 - Energy Segments on Trailer (diagram provided by ATS)

When transported by rail or vessel, a Flat-Rack or RORO would be used as shown in Figure 3. Lashing would be achieved as shown in Figure 2, above.



Figure 3 - Flat-Rack (credit: marineinsight.com)

For cabinet loading and unloading from CTUs, and as Bulk Freight transport, the hoist-lift plan as shown in Figure 4 is recommended:

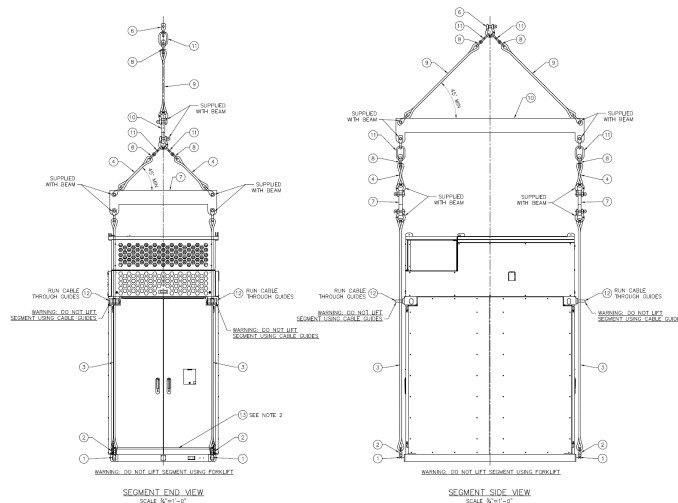


Figure 4 - Powin Energy Segment Lifting Plan



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At Issue is the intention of the UN3536 definition of CTU. *The definition of a Cargo Transport Unit* (CTU) in the UNDG ref. [1] page 26 "means a road transport tank or freight vehicle, a railway transport tank or freight wagon, a multimodal freight container or portable tank, or MEGC".

The UNDG [1] definition does not strictly call out compliance to *ISO 1496 Freight Containers*, but it also does not relieve the reader of the requirement. In fact, ref. [2] page 34 specifically presents a picture of an ISO Container.

In ref. [3] there is significant discussion within the UN Expert Working Group around the title for UN3536 with the following title changes discussed:

- Closed Cargo Transport Unit
- Transportable Battery Power System
- Transport Unit
- Power Storage Unit
- Cargo Transport Unit

Powin believes that the Power Storage Unit designation is more appropriate for the intended purpose of UN3536. The title *Cargo Transport Unit* should be reserved for the various transportation modes contained in the definition above.

Powin meets the requirements for UN3536 which includes the following from ref. [2]:

Transport Requirements - § 172.102, Special Provision 389:

- ✓ The lithium batteries must be of a type that have successfully passed the UN38.3 tests and contain the necessary systems to prevent overcharge and over discharge between the batteries.
- ✓ The lithium 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 the requirements of the HMR.
- ✓ Hazardous materials not necessary for the safe and proper operation of the cargo transport unit must not be transported within the cargo transport unit.

Required Hazard Communication - § 172.102, Special Provision 389:

- ✓ The batteries inside the cargo transport unit are not subject any marking or labeling requirements.
- ✓ The cargo transport unit must display the UN ID number (3536) on an orange panel, white square on point, or a Class 9 placard.
- ✓ The cargo transport unit must be placarded on two opposing sides with the Class 9 placard.
- ✓ Transportation by aircraft is forbidden, unless approved by the Associate Administrator.



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In conclusion, UN3536 is the only option that accurately represents Powin Energy Segment configuration of racks securing batteries and includes allowance for the air conditioning system. It is Powin's goal for the *Letter of Interpretation* to record that a Stack750 Centipede Energy Segment secured to a Flat-Rack, RORO, truck-trailer, or as bulk-freight meets the requirements of UN3536, and to synchronize those results across the UN, IMO, and other associated international bodies.

Sincerely,

Thomas Kerr
Program Manager
Powin



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References

- [1] ST/SG/AC.10/1/Rev.22 (Vol. I), "Recommendations on the Transport of Dangerous Goods (Vol. I)," 2021. [Online]. Available: <https://unece.org/info/Transport/pub/364867>.
- [2] PHMSA, "Lithium Battery Guide for Shippers," 2021. [Online]. Available: <https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/2022-09/Lithium-Battery-Guide-FN.pdf>.
- [3] ST/SG/AC.10/C.3/2019/8, "UN3536 "Lithium Batteries Installed in Cargo Transport Unit," 2019. [Online]. Available: <https://unece.org/DAM/trans/doc/2019/dgac10c3/ST-SG-AC.10-C.3-2019-8e.pdf>.