U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

August 24, 2023

Mr. Allen Peterson
Product Applications Mechanical Engineer
Qnergy
300 W 12th St.
Ogden, UT 84404

Reference No. 23-0043

Dear Mr. Peterson:

This letter is in response to your April 14, 2023, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to battery-powered equipment or machinery. In your email, you state that your company offers for transportation stand-alone battery-powered electrical equipment that provides electricity at remote jobsites when gaseous fuel is supplied by customers to enable electrical power generation. You also state that the equipment does not self-contain fuel and is completely purged of all fuel during transport. You further state that this generator equipment contains an upright, non-spillable, wet battery securely installed within the equipment's strong outer enclosure—as well as machinery you describe as a "refrigerating machine" that uses a hermetically sealed mass of heat transport media (compressed helium) to enable cooling of the combustor and conversion between heat transfer, pressure work, motion, and electricity. You request confirmation that this stand-alone battery-powered electrical equipment as described in your email is excepted from all requirements of the HMR in compliance with § 173.220.

In accordance with § 173.220(h), shipments made under the provisions of § 173.220 are not subject to any other requirements of the HMR for transportation by motor vehicle or rail car. Based on the description in your email, it appears that this stand-alone battery-powered electrical equipment would meet these provisions. Please note that a battery-powered generator must meet the requirements specified in § 173.220(c), which states that batteries must be securely installed, and wet batteries must be fastened in an upright position. Batteries must also be protected against a dangerous evolution of heat, short circuits, and damage to terminals in conformance with § 173.159(a) and leakage; or must be removed and packaged separately in accordance with § 173.159.

Further, § 173.220(f)(1) states that items containing other hazardous materials that are integral components of the equipment—and that are necessary for the operation of the equipment, or for the safety of its operator or passengers— are not otherwise subject to the requirements of the HMR. Based on your description of the compressed helium contained in the "refrigerating machine" element of the generator, the "refrigerating machine" would meet this provision. Please note that the item containing other hazardous materials must be securely installed in the equipment.

Lastly, please note that this stand-alone battery-powered electrical equipment may not be excepted from all other requirements of the HMR when transported by aircraft or vessel. Please see the provisions in § 173.220(h)(2) and (3) for transportation by aircraft or vessel.

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

23-0043

From: INFOCNTR (PHMSA)
To: Dodd, Alice (PHMSA)
Cc: Hazmat Interps
Subject: FW: Qnergy PowerGen - Interpretation Request
Date: Wednesday, April 26, 2023 8:26:23 AM
Attachments: image001.png
7030-102137-000.pdf

Good morning Alice,

Please see the attached interpretation request.

Let me know if you need anything.

Regards,

-Breanna

From: Allen Peterson <allen.peterson@qnergy.com>
Sent: Friday, April 14, 2023 3:31 PM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Cc: Steve Maughan <steve.maughan@qnergy.com>; Ory Zik <ory.zik@qnergy.com>
Subject: Qnergy PowerGen - Interpretation Request

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.

Attention: PHMSA's Office of Hazardous Materials, **Information Center**
Regarding: Qnergy **PowerGen** products and compliance with regulation.
Reference: Qnergy document 7030-102137-000 Rev A (20230414)

Qnergy requests **confirmation** that the attached letter represents **proper interpretation** of regulations.

The attached describes Qnergy's PowerGen as battery-powered equipment, containing non-bulk quantities of hazardous material which are necessary for equipment operation. Please confirm that PowerGen products are excepted from regulation according to the **specific exceptions** identified.

Thank you for confirming this interpretation. Please look at the Qnergy website for any additional product information and for details about PowerGen if needed.
Qnergy Engineering.

Allen Peterson

Product Applications
Mechanical Engineer

Mobile: +1 801.833.4531
Email: Allen.Peterson@Qnergy.com
Website: qnergy.com
Address: 300 W 12th St., Ogden, UT 84404

*This email or attachments includes Confidential Information, proprietary information, and sensitive information that must be protected against unauthorized disclosure. If you have received this email in error, do **NOT** copy or retain the documents. Please immediately destroy them and promptly notify the sender.*

Ory Zik
300 W 12th St.
Ogden, UT 84404
www.qnergy.com
(617) 943-3215
Ory.Zik@Qnergy.com

Standards and Rulemaking Division, Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation, East Building
1200 New Jersey Avenue, SE.
Washington, DC 20590-0001
(800)467-4922
infocntr@dot.gov

ATTN: PHH-10,
Regarding: Interpretation of Federal Regulations, Title 49/Subtitle B/Chapter I and its subparts (‘***the Code’***).

According to ***the Code***, **section 105.20** and its parts, regarding compliance with, **and interpretation of regulations:**

> ***Qnergy requests review and approval of its interpretation of the Code, as applied to the following commercial products.***

Qnergy Inc. offers products for commerce and for international, interstate, and intrastate transportation. These products include standalone, ‘battery-powered,’ stationary electrical equipment. Such Qnergy machinery provides electricity at remote jobsites when gaseous fuel is supplied by customers to enable electrical power generation. Qnergy equipment does not self-contain fuel and is completely purged of all fuel during transport. Qnergy identifies products of this type within its ‘**PowerGen**’ model group, and possibly other future naming.

Qnergy generator equipment is **excepted from *the Code*** according to the following interpretation logic:

Identification of Hazardous Material
PowerGen standalone generators necessarily include an upright, non-spillable, wet battery. PowerGen batteries are securely installed within the equipment’s strong outer enclosure, in conformance with ***the Code***, section 173.159(a). Within ***the Code***, Table 172.101, a PowerGen battery is identified as:

- **UN2800**, Division 8, Packaging group III, hazardous material
- PowerGen typically uses one battery, massing approximately <30kg TOTAL, which is non-bulk transportation.

PowerGen consumes gaseous fuel to generate useful electricity for its users. To operate, PowerGen requires a first combustion subfunction, which releases heat from customer-supplied onsite fuel sources. A second required subfunction is power conversion. A proprietary, heat-pumping converter directly cools the combustion equipment. Absorbed heat is processed within the converter by means of a closed, reversible thermodynamic power cycle, creating pressure work, and then directly driving motion of an electrical alternator to generate AC-electrical power available to users. The cooler/converter is directly heated by the combustor and can therefore be referred to as an externally heated converter (EHC). Qnergy tradename for the EHC is presently QB80 but Qnergy might choose different, alternative model naming over time.

PowerGen's EHC contains a hermetically sealed mass of heat transport media to enable cooling of the combustor and then also conversion between heat transfer, pressure work, motion, and electricity. Within ***the Code***, Table 172.101, the specific EHC cooling media is identified as:

- **UN1046**, Division 2.2, compressed gas.
    - This is helium. It is inert, non-flammable, non-oxidizing, non-poisonous, non-liquefied, non-toxic, and not a hazard once decompressed.
- EHC cooling media will typically mass approximately <0.5kg, which is non-bulk transportation.
- Qnergy may use UN1066, Division 2.2 compressed gas as an alternative media in future EHC's.

Exceptions:

The Code, Table 172.101, directs to **Exception 173.307(a)(4)(i)**, applicable to either type of Division 2.2 heat transfer media transported within PowerGen. **PowerGen is excepted from all of Chapter C requirements**, since the EHC and its media act together as a 'refrigerating machine.' A fixed pre-charge of compressed gas enables the EHC to cool the PowerGen combustion function.

The term 'refrigerating machines' is not explicitly defined within ***the Code***. Qnergy interprets the wording as:

- Refrigerating machines are equipment which **remove heat from some other source** (the combustor).
    - Sub-ambient cooling capability is not explicitly required for refrigerating machines but is a well-known capability when using 'reversible' power cycle EHC equipment of this type. If the combustion subfunction of PowerGen is disabled, and the PowerGen EHC subfunction remains operational, then the EHC heat exchanger **temperature drops below ambient**. Frost forms on the heat absorber by freezing relative humidity out of local ambient air.

Both the EHC heat transfer media, and the non-spillable wet battery are integral to PowerGen and are **necessary for operation** of the off-grid generator, once deployed, and commissioned at a remote jobsite. According to ***the Code***, Subchapter C, **Exception 173.220(f)(1)**, both hazardous materials identified in this letter are **excepted from all of Subchapter C requirements**, since they are both integral components that are necessary for operation of the mechanical equipment.

PowerGen contains relatively small, non-bulk amounts of hazardous material within its strong outer enclosure but is excepted from ALL of Subchapter C commercial transportation requirements within ***the Code***.

Please verify approval of Qnergy's interpretation of ***the Code*** or let us know if you have any questions. Thankyou.

	SIGN	DATE
Ory Zik	*<on file>*	2023, April 5
Steve Maughan	*<on file>*	2023, April 5
TBD Lawyer Signature	*<on file>*	2023, April 5
Norman Newhouse	*<on file>*	2023, April 5

PowerGen Background Information – More information on PowerGen is available from the Qnergy website. https://qnergy.com/powergen-series/

PowerGen is the first choice of customers needing reliable electrical power for the most demanding, mission critical applications in the most extreme and unforgiving environments.

Based on our low maintenance Free Piston Stirling engines, PowerGen generators work with a variety of fuels including natural gas, propane, ethane, biogas and multiple associated gas streams. Highly configurable and available at 600, 1200, 1800 and 5650 watt power levels, there's a PowerGen model suited to nearly every site and load requirement. Each model offers exceptional monitoring and control combined with minimal servicing and low TCO.