



DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR parts 106, 107, 171, 172, 173, 174, 175, 176, 177, 178, 179, and 180

[Docket No. PHMSA-2024-0065 (HM-267)]

RIN 2137-AF69

Hazardous Materials: Modernizing Regulations to Facilitate Transportation of Hazardous Materials Integral to Spacecraft Components and Payloads

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

ACTION: Advance notice of proposed rulemaking (ANPRM).

SUMMARY: PHMSA is publishing this ANPRM to solicit feedback on streamlining and modernizing the Agency's regulations as they relate to the transportation of hazardous materials integral to spacecraft payloads or components.

DATES: Comments must be received by **[INSERT DATE 90 DAYS FROM DATE OF PUBLICATION IN THE FEDERAL REGISTER]**. However, PHMSA will consider late-filed comments to the extent possible.

ADDRESSES: You may submit comments identified by the docket number PHMSA-2024-0065 (HM-267) by any of the following methods:

- *Federal e-Rulemaking Portal:* <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- *Fax:* 202-493-2251
- *Mail:* Docket Management System, U.S. Department of Transportation, Dockets Operations, M-30, Ground Floor, Room W12-140, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590.

- *Hand Delivery:* U.S. Department of Transportation, Docket Operations, M-30, Ground Floor, Room W12-140 in the West Building, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Instructions: All submissions must include the agency name and docket number (PHMSA-2024-0065) or RIN 2137-AF69 for this ANPRM at the beginning of the comment. Note that all comments received will be posted without change to <http://www.regulations.gov> including any personal information provided. If sent by mail, comments must be submitted in duplicate. Persons wishing to receive confirmation of receipt of their comments must include a self-addressed stamped postcard.

Confidential Business Information: Confidential Business Information (CBI) is commercial or financial information that is treated both customarily and actually as private by its owner. Under the Freedom of Information Act (FOIA, 5 U.S.C. § 552), CBI is exempt from public disclosure. It is important you clearly designate the comments submitted as CBI if your comments responsive to this document contain commercial or financial information that customarily is treated as private; you actually treat as private; and is relevant or responsive to this notice. Pursuant to 49 CFR 105.30, you may ask PHMSA to provide confidential treatment to information you give to the Agency by taking the following steps: (1) mark each page of the original document submission containing CBI as “Confidential:” (2) send PHMSA, along with the original document, a second copy of the original document with the CBI deleted; and (3) explain why the information you are submitting is CBI. Submissions containing CBI should be sent to Noah Jacobson by mail at Standards and Rulemaking Division, Pipeline and Hazardous Materials Safety Administration, 2nd Floor, 1200 New Jersey Avenue S.E., Washington, D.C. 20590-0001, or by e-mail at noah.jacobson@dot.gov. Any information PHMSA receives that is not designated specifically as CBI will be placed in the public docket.

Docket: For access to the docket to read background documents or comments received, go to <https://www.regulations.gov>. Follow the online instructions for accessing the docket. You also may review the documents in person at the address listed above.

FOR FURTHER INFORMATION CONTACT: Noah Jacobson by e-mail at noah.jacobson@dot.gov or Steven Andrews by e-mail at steven.andrews@dot.gov, or by mail at Standards and Rulemaking Division, Office of Hazardous Materials Safety, PHMSA, East Building, PHH-10, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590-0001.

SUPPLEMENTARY INFORMATION:

Abbreviations and Terms:

ANPRM	Advance Notice of Proposed Rulemaking
CBI	Confidential Business Information
CFR	Code of Federal Regulations
DHS	Department of Homeland Security
DOT	Department of Transportation
DOW	Department of War (<i>i.e.</i> the Department of Defense)
FAA	Federal Aviation Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
HMR	Hazardous Materials Regulations
NASA	National Aeronautics and Space Administration
PHMSA	Pipeline and Hazardous Materials Safety Administration
PRD	Pressure Relief Device
USCG	United States Coast Guard

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I. Executive Summary

PHMSA is publishing this ANPRM to solicit stakeholder input on opportunities to amend requirements in the Hazardous Materials Regulations (HMR) for spacecraft (*e.g.*, launch vehicles, reentry vehicles) and space operations that require the transportation of hazardous materials integral to spacecraft payloads or components (*i.e.*, transporting satellites, capsules, and

related equipment to and from launch and recovery sites by all transportation modes, but most often by highway or vessel).¹ The President identified enabling competition and innovation in the commercial space industry as a priority in Executive Order (E.O.) 14335 (“Enabling Competition in the Commercial Space Industry”).² Consistent with the President’s directive, PHMSA is seeking stakeholder feedback regarding opportunities to streamline and modernize the requirements in the HMR that apply to commercial space operations.

The commercial space sector is growing rapidly. Hazardous materials are often incorporated into spacecraft payloads and components. However, the goods shipped for these space operations are often limited-use shipments of unique packagings or articles containing various hazardous materials with unique containment methods. For example, a payload may consist of a satellite built with Division 2.2 gases in non-specification heat pipes, a Class 1 explosive squib, and proprietary Class 9 lithium batteries. Such a satellite can be difficult to classify for transportation to a launch site due to the presence of an integrated Class 1 explosive material and could encounter further issues with material segregation requirements depending on the specific hazardous materials used in the satellite’s construction. In addition, the functions of hazardous materials employees working on these payloads and components likely will be different from traditional hazmat employee functions, necessitating unique function-specific training.

To account for the complexities of space operations, PHMSA has issued special permits to government and private entities, providing variances from the requirements of the HMR to facilitate the domestic transportation of hazardous materials in commerce in support of space operations. PHMSA is requesting public input to determine what existing standards and best practices are used in the space sector to ensure the safety of these hazmat shipments, and what regulations may be unnecessary when operating under these standards and best practices. This

¹ See 49 CFR parts 171-180.

² 90 FR 40219 (Aug. 19, 2025).

will improve government efficiency and provide regulatory certainty for the regulated community by reducing the need to issue special permits and addressing cases in which the regulations do not prescribe specific provisions.

II. Background

The HMR is designed primarily with traditional transportation methods and packagings in mind. PHMSA issues special permits to allow regulated entities to deviate from the requirements of the HMR when PHMSA determines the permitted activity, which may involve new technology and operational controls, will maintain an equivalent level of safety. PHMSA reviews active special permits and considers them for inclusion in future rulemakings based on their safety record and general applicability. These rulemakings have included packagings and industry testing and design standards not authorized or incorporated previously into the HMR.

Spacecraft and their components often are engineered with different parameters than traditional packages of hazardous materials due to weight constraints, material requirements, and cost factors. Packaging traditionally authorized by the HMR may be impractical for the containment of hazardous materials integral to spacecraft payloads and components. PHMSA has granted special permits since 1970 to the National Aeronautics and Space Administration (NASA), Department of War (DOW), and the commercial space industry to allow for innovative components containing hazardous materials to move in commerce. As the frequency of commercial space launches has increased in recent years,³ PHMSA is now reviewing the HMR and relevant special permits to look for opportunities to address the commercial transportation of hazardous materials integral to spacecraft payloads or components.

III. Special Permits Issued

PHMSA issues special permits to facilitate the transportation of hazardous materials related to space operations that maintain safety while reducing the burden of regulations that did

³ See, e.g., FAA, *Commercial Space Data*, https://www.faa.gov/data_research/commercial_space_data (accessed June 11, 2025).

not contemplate the breadth of today's commercial space industry. In the development of this ANPRM, PHMSA conducted an analysis of previously issued special permits involving the transportation of hazardous materials for space operations to understand which hazardous materials are frequently transported and what types of relief are typically granted. Special permits offer alternative compliance with an equivalent level of safety for cases where the HMR as written may not meet the needs of a shipment or new technology. PHMSA assessed 60 special permits and identified that the majority of the special permits granted fall into three categories of alternative compliance:

1. Authorizing non-specification pressure vessels and waiving pressure relief device (PRD) requirements for Division 2.2 gases.
2. Providing alternative forms of hazard communication.
3. Authorizing lithium-ion batteries or cells under alternative testing requirements.

Alternative testing, hazard communication, and pressurized gas containment methods are generally used under these circumstances to maintain an equivalent level of safety while providing relief from requirements not intended for the conditions and parameters of space travel. PHMSA acknowledges there is a time and resource cost for industry to request and to obtain special permits for these operations; therefore, PHMSA is considering ways to reduce costs and to streamline operations while maintaining an equivalent level of safety. However, before PHMSA is able to propose changes to the HMR, it is crucial that PHMSA solicits stakeholder input on the existing standards, requirements, and best practices that ensure public safety during more common shipments. While special permits address unique scenarios, PHMSA is looking to understand the larger context used by industry to develop or to adopt future performance standards in the HMR. To address the transportation in commerce of hazardous materials integral to spacecraft payloads and components, public feedback will provide PHMSA with a clearer picture of hazardous materials transportation by the space industry.

IV. Objective

Federal Hazardous Materials Transportation law authorizes the Secretary to “prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce.”⁴ The Secretary has delegated this authority to PHMSA.⁵ PHMSA has designed the HMR to achieve three primary goals: (1) to ensure that hazardous materials are packaged and handled safely and securely during transportation; (2) to provide effective communication to transportation workers, emergency responders, and the general public of the hazards of the materials being transported; and (3) to minimize the consequences of an incident should one occur. The HMR represent a risk management system that is prevention-oriented and focused on identifying safety or security hazards to reduce the probability and consequences of a hazardous material release.

PHMSA also works closely with its modal partners in developing modal specific regulations and guidance involved in the transportation of hazardous materials. The primary modal administrations that PHMSA works with are the: (1) Federal Railroad Administration (FRA) for the safe transportation of hazardous materials by rail;⁶ (2) Federal Aviation Administration (FAA) for the safe transportation of hazardous materials by air;⁷ (3) United States Coast Guard (USCG), part of the Department of Homeland Security (DHS), for the safe transportation of hazardous materials by vessel;⁸ and (4) Federal Motor Carrier Safety Administration (FMCSA) for the safe transportation of hazardous materials by public highway.⁹

In this ANPRM, PHMSA seeks public comment on current industry best practices, existing consensus standards, and regulatory challenges industry experiences when transporting

⁴ 49 U.S.C. 5103(b).

⁵ 49 CFR 1.97(b).

⁶ 49 CFR part 174.

⁷ 49 CFR part 175.

⁸ 49 CFR part 176.

⁹ 49 CFR part 177.

hazardous materials integral to spacecraft payloads or components by all modes of transportation, and the challenges faced by emergency first responders. This ANPRM provides an opportunity for public participation in the development of regulatory amendments and promotes a greater exchange of information and perspectives among various stakeholders. This step in the rulemaking process is intended to lead to more focused and well-developed proposals in future rules that reflect the views of all relevant parties.

V. Questions for Public Comment

PHMSA invites comments and suggestions on how to address the transportation of hazardous materials integral to spacecraft payloads and components in the HMR and the regulatory challenges industry faces when transporting spacecraft to a launch site, transporting recovered spacecraft, and performing related operations while maintaining a high level of safety. Whenever possible, please provide supporting data or specific examples. When responding to a specific question below, please note the question number in your comment to assist PHMSA in properly compiling information that it receives.

1. What specific regulatory challenges do you encounter during the terrestrial transportation of hazardous materials in support of space operations?
2. As noted above in Section III, certain types of alternative compliance are frequently granted through special permits. What existing standards (in addition to HMR-required standards) do you use currently in the design and manufacturing of devices and articles containing hazardous materials shipped for space operations? Could these standards be considered for incorporation into the HMR?
3. What packagings or articles used to transport hazardous materials in support of space operations are not designed or tested to an existing consensus industry standard? Are there currently any industry-led initiatives to develop new standards for the transportation and packaging of these products?

4. PHMSA is interested in understanding the existing requirements of other Federal agencies (*e.g.*, NASA, DOW) to determine which requirements in the HMR may be redundant. From the industry stakeholder perspective, are there requirements in the HMR that are redundant with the regulatory requirements of other Federal agencies?
5. In what ways are the training requirements of hazardous materials employees working in the space industry different from those of the hazardous materials industry as a whole?
6. Are there hazard communication requirements that you believe are unnecessary for the transport of hazardous materials to support space operations? What operational controls are used during the transportation of hazardous materials for space operations that could eliminate the need for certain hazard communication? Similarly, what potential challenges could be faced by emergency first responders if hazard communication is reduced? Potential examples include the use of closed roads or transport of hazmat with a security escort.
7. An article or device containing several different hazardous materials may be difficult to classify accurately, particularly if a Class 1 explosive material is a component (*e.g.*, an explosive squib). What specific definitions or provisions for common types of articles or devices that integrate multiple hazardous materials, such as satellites or capsules, would provide more clarity for classification of the associated hazards?
8. What specific operational controls or other similar containment methods should be considered for assembled spacecraft being transported in commerce for space operations? What operational controls are used during the transportation of hazardous materials for space operations that could ensure an equivalent level of safety to performance-oriented packaging requirements?
9. How are batteries integrated into components of spacecraft or payloads? What battery chemistries are being used? How are those batteries transported during the integration process and spacecraft recovery process?

10. How frequently do you transport multiple hazardous materials together in support of space operations and what operational controls are used? How frequently do you move only an individual hazardous material or article in support of space operations?
11. What modes of transportation (*e.g.*, highway, rail, vessel, air) do you use to transport hazardous materials in support of space operations? Should any potential HMR provisions be limited to a specific-transport mode?

As noted above, PHMSA seeks comment on each of these questions, as well as any additional information that may be pertinent when considering how to address space operations in the HMR.

Issued in Washington, D.C., on January 26, 2026, under the authority delegated in 49 CFR 1.97.

William A. Quade

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Pipeline and Hazardous Materials Safety Administration

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