

Hazardous Materials Regulations: A Regulatory Primer

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Over one million shipments of hazardous materials reportedly travel in U.S. commerce every single day.

A common misunderstanding is the nature of hazardous materials—they are more commonplace than you think! Another misunderstanding is the scope of regulated parties. Regulatory compliance obligations behind those shipments are a day-to-day challenge for the entire cast of characters in the manufacturing, warehousing, and transportation of goods. Safe and efficient supply chains require attention to the precise commodity-level classifications as well as the physical and paperwork activities that follow.

This article delivers a primer on the federal regulations impacting all participants in hazardous materials movements.

Federal Regulatory Framework

The Hazardous Materials Regulations (HMRs) are enforced by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) (49 USC 5103). The HMRs apply to enumerated hazardous materials (hazmats). The HMRs contain universal responsibilities for shippers who handle and tender the goods, carriers who haul the goods, and those who may otherwise handle or store the goods along the way (49 USC 5103; 49 CFR Parts 171-180). The HMRs also contain specific regulations based on the party, the material, and the movement. For example, certain regulations may apply only to surface carriage via road or rail while other regulations may apply only to air or ocean carriage. PHMSA periodically updates the regulations and solicits to modernize the rules and improve efficiency and stakeholder engagement. PHMSA considers comments from industry when it makes these regulatory updates and most recently requested public comment on a sweeping range of topics in December 2023.

Regulated Persons and Functions

The HMRs apply to persons and to the functions they perform (49 CFR 171.1(a-c)). Regulated persons are those who manufacture, fabricate, mark, maintain, recondition, repair, or test a package or component of a packaging that is for use in the transportation of hazmats in commerce (49 CFR 171.1(a)). Regulated functions include offering a hazmat for transportation in commerce, incidental loading, unloading, storage, and performing any "pre-transportation functions" such as determining hazard class, marking, labeling, and more (49 CFR 171.(b-c)). Operational functions that are generally not regulated by the HMRs include: storage of freight containers, transport vehicles, or packages containing a hazmat at an offeror facility prior

to carrier possession; and rail or motor vehicle movements of a hazmat within a contiguous facility boundary where public access is restricted (49 CFR 171.1(d)).

Regulated Substances and Materials

The HMRs define a hazmat as a substance or material determined to present unreasonable risk to health, safety, and property when transported in commerce and designated as “hazardous” (49 CFR 171.8, 49 USC 5103). There are nine classes of hazardous materials: explosives; flammable and combustible liquids; poisons (toxic) and poisonous inhalants; corrosive materials; gases, oxidizers, and organic peroxides; radioactive materials; miscellaneous and general dangerous materials; flammable solids; and spontaneously combustible and dangerous when wet materials. The HMRs describe a list of Hazardous Substances (excluding radionuclides), and also describe specific regulations applicable to certain hazmat materials and combinations of hazmat in PHMSA’s Hazardous Materials Table (49 CFR 172.101 and Appendix A).

Universal Compliance Responsibilities

Each person or party who performs a regulated (or “covered”) function has certain responsibilities regardless of what role they perform in a hazmat movement. Persons who perform covered functions must do so in accordance with the HMRs (49 CFR 171.2). General responsibilities for shipping hazmats include maintaining emergency response information, training employees performing covered functions, safety and security planning, and registering with the DOT as necessary (49 CFR Part 172, Subparts G-I).

Emergency Response Information - Persons offering hazmats for transportation, accepting for transportation, storing, or otherwise handling hazmats must ensure that emergency response information is immediately available for use at all times a hazmat is present (49 CFR 172.600(c)(1)). The emergency response information must minimally include an emergency telephone number and a basic description and the technical name of the hazmat; immediate hazards to health it poses, including risks of fire or explosion; necessary precautions in the event of an incident; methods for handling fires and spills or leaks; and preliminary first aid instructions (49 CFR 172.600-602). The information must be printed legibly in English and available for use away from the hazmat package, ideally presented on the bill of lading or other shipping document (49 CFR 172.602). Additional and distinct requirements apply to carriers and facility operators (49 CFR 172.602(c)). Carriers, for example, must mark the transport vehicle with the phone number of the motor carrier and must ensure that the hazmat shipping papers, which include the bill of lading and other documents related to the movement, are readily available on the transport vehicle (49 CFR 172.606).

Training - PHMSA defines Hazmat Employers as those who cause hazmats to be transported in commerce, and who employ or use at least one hazmat employee, or who design or manufacture, or perform other functions pertaining to hazmats (49 CFR 171.8). Hazmat Employers are required to train and test their hazmat employees regulations (49 CFR 182.701). Training must include general familiarization regarding applicable regulations and must also include training specific to the function the employee performs, as well as safety training, and security awareness training (49 CFR 172.704). Initial employee training should be followed up by recurrent training at least once every three years, but if security plans are revised, then training must occur regarding the new plan within ninety (90) days of implementation (49 CFR 172.704).

Safety and Security Planning - Security plans are required for certain quantities and types of hazmats (49 CFR 172.800). Specific security plan components are also required to mitigate risk, including plans related to risk assessment, personnel security, unauthorized access prevention and mitigation, and en route security measures (49 CFR 172.802). Additional requirements apply for transportation of hazmats by rail (49 CFR 172.820).

Annual Registration - Offerors and transporters of hazmats in foreign, interstate, or intrastate commerce (typically shippers and carriers) must register annually and must pay a registration fee if certain kinds or quantities of hazmats are involved (49 CFR 107.601-620). Registration applies to highway route-controlled quantities of radioactive materials, more than 55 pounds of certain explosive materials in surface transportation, or more than one 1.06 quarts per package of materials that are toxic by inhalation, as well as to certain quantities of shipments (49 CFR 107.601).

Shipper-Specific Compliance Responsibilities

Offerors of hazmats for transportation in commerce (typically shippers) have the general responsibility to classify and describe hazmats offered, determine the appropriate packaging or container, and authorize its use, prepare shipping papers, and perform all functions necessary to bring packaging into compliance with the HMRs (49 CFR 172.3, 49 CFR Part 172).

Classification - A shipper is responsible to classify and correctly describe hazmats (49 CFR 173.22(a)(1)). The hazmat class is indicated by class or division grouping number or class name (49 CFR 173.2). The Hazmat Table designates materials as hazardous for purposes of transportation and identifies hazard class or specifies if a material is forbidden in transportation, and it also identifies regulations that specify exceptions or packaging and other requirements (49 CFR 172.101).

Packaging - A shipper must ensure that the packaging or container in which they offer the hazmat is in compliance with applicable regulations (49 CFR Part 173). Packaging requirements apply based on the type of material and mode of transportation. Specific packaging requirements or exceptions may apply based on mode, quantity, or de minimis materials.

Preparing Shipping Papers - A shipper is also responsible to prepare shipping papers associated with the hazmat movement (49 CFR Part 172 Subpart C). PHMSA defines a shipping paper as a shipping order, bill of lading, manifest, or any other shipping document serving a similar purpose (49 CFR 171.8). Specific form and color requirements apply to shipping papers and the hazmat descriptions contained on them must be legible and printed in English (49 CFR 172.201). If a shipping paper is more than one page long, a continuation paper is required, and an emergency response telephone number must be included (49 CFR 172.201). Shippers must retain shipping papers for two years after acceptance of the hazmat by the carrier (49 CFR 172.201).

Marking - Shippers must satisfy the marking requirements that generally apply to packages and containers (49 CFR 172.300-338). A correct marking will typically show the shipping name, identification number, technical name, consignee and consignor, and address of the hazmat shipment. Additional or other requirements will apply based on the hazmat shipment, the packaging used (bulk or non-bulk), and the quantity of the hazmat. Specific form and application requirements apply to the marking including that it must be written in English and printed or affixed to the surface of a package or on a label, or tag, or sign. The marking must not be obscured by any labels and

must appear in a color that sharply contrasts the background against which the marking sits. PHMSA prohibits marking a package that does not contain the hazmat or residue identified on the marking (49 CFR 172.303).

Labeling - Shippers must also satisfy the labeling requirements that generally apply to packages and containment devices, such as non-bulk and bulk packages and containers, including tanks and overpack (49 CFR 172.400). Labels generally express the hazard associated with the hazmat shipment and typically include the hazard class and hazard division number of the material (for example, a “flammable solid” or “explosive 1.5”). The label including that information must be printed or affixed to the surface of the package or containment device near the shipping name of the material, and it must meet certain durability, size, font, and color requirements (49 CFR 172.406-407).

Placarding - Finally, shippers must satisfy the placarding requirements that generally apply to containers and vehicles, including bulk packaging, freight containers, unit load devices, transport vehicles, and rail cars (49 CFR 172.504). Placards will express the hazard associated with the hazmat or all the hazmat shipments transported. This will indicate hazard class and hazard division number. Placards are used by the carrier on each side and each end of the container or vehicle. Additional requirements, prohibitions, or exceptions may apply based on the hazard class of the hazmat, or the hazmats moved (49 CFR 172.502). While shippers will generally provide the placard and be responsible for regulatory requirements, a motor carrier is responsible to refuse transportation of any hazmat shipment that requires placards and does not have them (49 CFR 172.506).

Carrier-Specific Compliance Responsibilities

Hazmat carriers are responsible for the universal responsibilities described in this primer, including having and maintaining emergency response information, training employees performing covered functions, and safety and security planning. Additional requirements may apply to loading and unloading. One of the more common questions we receive around carrier responsibilities involves required insurance levels. Carriers are required to have insurance by the DOT’s Federal Motor Carrier Safety Administration (FMCSA) depending on the operations performed and the size and weight specification of the vehicle or vehicles used (49 CFR 387.7, 387.9). Motor carriers hauling hazmats are subject to insurance requirements that can range from \$1 million to \$5 million in policy minimums (49 CFR 387.9).

Finally, additional rules can apply based upon transportation mode and nature of commerce. General responsibilities apply to hazmat carriers, while specific responsibilities will vary by mode (road, rail, air, and ocean). The International Air Transport Association’s Dangerous Goods Regulations (IATA’s DGRs) apply to dangerous goods transported by air carrier. The International Maritime Organization’s International Maritime Dangerous Goods Code (IMO IMDG) applies to dangerous goods transported by ocean carrier.

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