

3 Hazardous Materials

31 Definition

A hazardous material is any article or substance designated by the U.S. Department of Transportation (DOT) as being capable of posing an unreasonable risk to health, safety, or property during transportation. In international commerce, hazardous materials are known as “dangerous goods.” For definitions of other terms that relate to hazardous materials, refer to Appendix D.

32 General

321 **U.S. Department of Transportation (DOT)**

The U.S. Department of Transportation (DOT) is the federal agency responsible for regulating the carriage of hazardous materials within the United States via any mode of transportation (i.e., highway, rail, air, water). The federal regulations of DOT are codified in Title 49 *Code of Federal Regulations* (49 CFR). 49 CFR contains DOT’s detailed specifications for packaging, marking, and labeling hazardous materials. Title 49 also exempts or establishes other requirements for limited quantities and small quantities of hazardous materials.

322 **Postal Service**

The carriage of U.S. Mail by the Postal Service is regulated by Title 39 *Code of Federal Regulations* (39 CFR) and is not subject to the federal regulations in 49 CFR as commercial carriers are. Unlike the commercial carriers, the Postal Service is, however, subject to the restrictions in Title 18 *United States Code 1716* (18 U.S.C. 1716), which prohibits from mailing all matter that is outwardly or of its own force dangerous to life, health, or property (see 211). Accordingly, for legal and safety reasons, the postal mailing standards for hazardous materials in DMM C023 and this publication not only closely adhere to 49 CFR, but also include many additional limitations and prohibitions. In many instances, the postal standards are more restrictive than the requirements of other commercial carriers. For example, 49 CFR allows commercial shippers to send flammable materials by air, but the

Postal Service prohibits the mailing of all flammable materials via air transportation.

As a result, most hazardous materials are nonmailable. The postal regulations generally limit the mailing of hazardous materials to ORM-D materials as defined in 333. Although most mailable hazardous materials fall within the ORM-D category, postal regulations do permit the mailing of a small number of hazardous materials having a greater handling and transportation risk than ORM-D materials. This allowance is limited to the following:

- a. Toy propellant devices and safety fuses in Division 1.4S as permitted in 341.22 and DMM C023.2.0.
- b. Toxic substances in Division 6.1 that have an LD₅₀ for oral toxicity of greater than 5 mg/kg but less than 50 mg/kg as permitted in 346.231 and DMM C023.7.0.
- c. Infectious substances (etiologic agents) and medical wastes in Division 6.2 as permitted in 346.23 and DMM C023.8.0.
- d. Radioactive materials in Class 7 that fall within the specific activity limits permitted in 347 and Exhibit 347.22.
- e. Dry ice and magnetized materials in Class 9 as permitted in 349 and DMM C023.11.0.

323 **Mailer Responsibility**

Full responsibility rests with the mailer to comply with all postal and nonpostal laws and regulations in the mailing of hazardous material. Anyone who mails, or causes to be mailed, a nonmailable or improperly packaged hazardous material can be subject to legal penalties (i.e., fines and/or imprisonment), including but not limited to those specified in 18 U.S.C. The transport of hazardous materials prior to entry as U.S. Mail is subject to DOT regulations.

324 **Mailability Rulings**

For information on how to request a mailability ruling for a specific hazardous material, see 215.2 and DMM C023.1.5.

325 **DOT Hazardous Materials Warning Labels**

In commerce, packages containing hazardous materials (except those qualifying as an ORM-D material or a limited quantity shipment) must display the appropriate DOT diamond-shaped hazardous materials warning label. Any mailpiece bearing, or required under 49 CFR to bear, one of the warning labels shown in Exhibit 325a is prohibited from mailing. The warning labels shown in Exhibit 325b may appear only on mailpieces containing mailable hazardous materials that require use of the label under postal requirements. (The labels shown in the exhibits are not shown to size. DOT warning labels must meet the size and color requirements in 49 CFR 172.407 to 172.446.)

Exhibit 325a
DOT Hazardous Materials Warning Labels: PROHIBITED IN THE MAIL

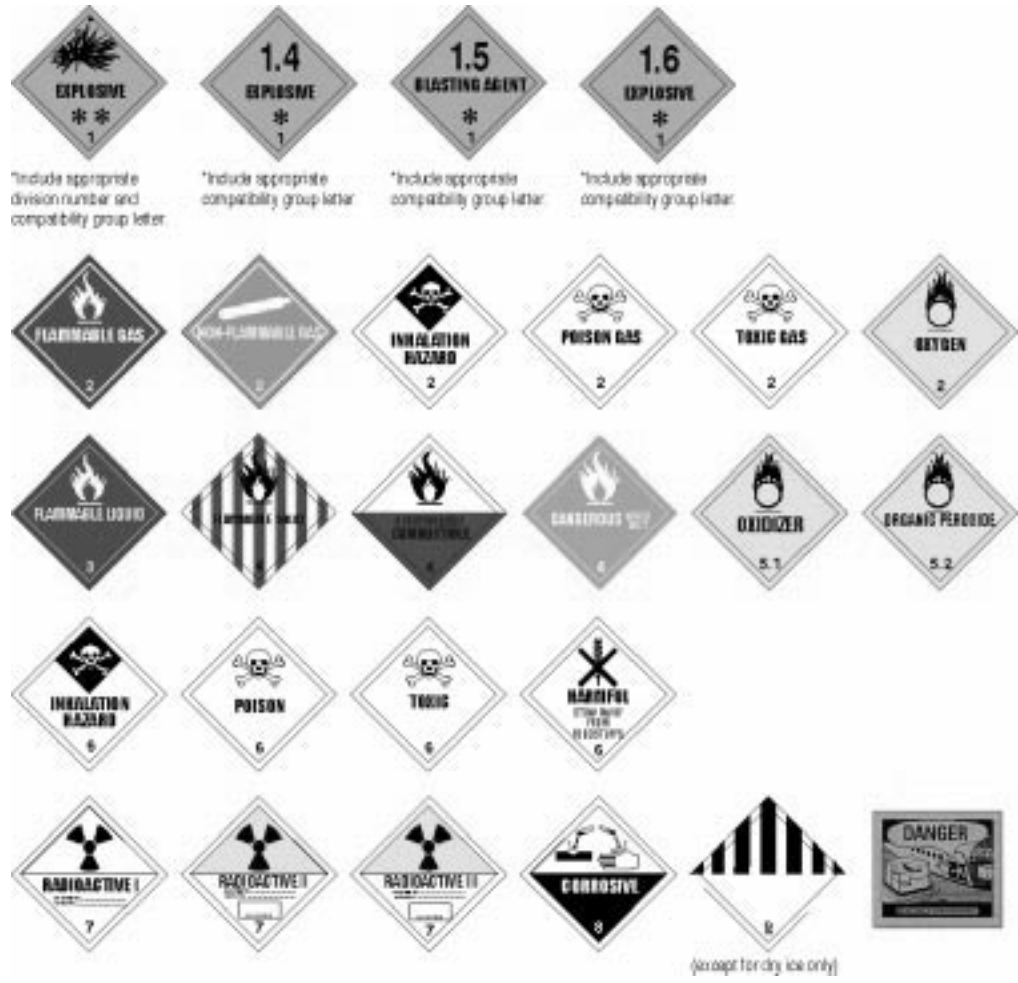
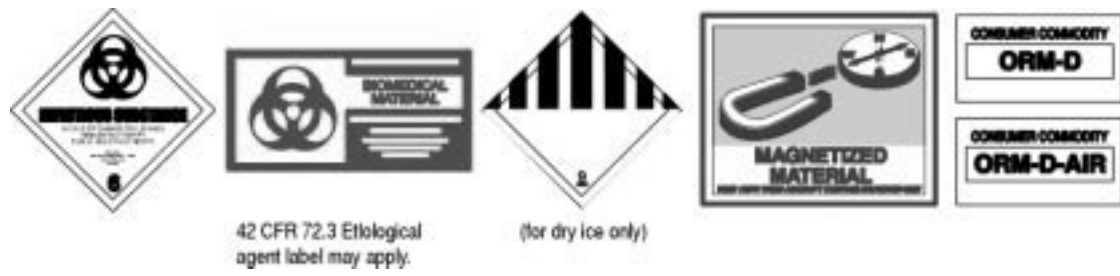


Exhibit 325b
DOT Hazardous Materials Warning Labels: PERMITTED ON MAILABLE HAZARDOUS MATERIALS



326 Shipping Papers

A shipping paper is defined as a shipping order, bill of lading, waybill, manifest, or any other document used to identify a hazardous material being offered for transport. The requirements on how to properly prepare shipping papers are detailed in 49 CFR 172.200 through 172.204. The shipping paper must be affixed to the outside of the mailpiece. A plastic envelope or carrier can be used for this purpose. The following conditions also apply:

- a. *Air Transportation.* Most mailable hazardous materials (including ORM-D materials) must be accompanied by a shipper's declaration for dangerous goods (i.e., shipping paper). The document must be properly completed and signed in triplicate by the mailer. A sample form is shown in Exhibit 326. To determine which mailable hazardous materials require a shipping paper when sent via air transportation, refer to the appropriate sections in this chapter, the appropriate Packaging Instruction in Appendix C, and DMM C023.
- b. *Surface Transportation.* A mailpiece containing a mailable hazardous material other than an ORM-D material must be accompanied by a properly prepared shipping paper.

Neither DOT nor the Postal Service makes blank shipper's declaration forms available to shippers of hazardous materials. It is the responsibility of the shipper to obtain forms meeting the format specifications in 49 CFR from commercial printers or vendors. The shipper is also responsible for properly completing the form prior to mailing.

327 Transportation Requirements

327.1 General

- a. *Air Transportation.* Mailable hazardous materials eligible for air transportation must be sent as Express Mail, Priority Mail, or First-Class Mail, as permitted. Mailpieces must be prepared to meet all requirements that apply to air transportation, regardless of whether the parcel will be transported by air by the Postal Service. Mailpieces must be properly packaged and labeled within DMM requirements and the operator variations of the air carrier. When required, a shipper's declaration for dangerous goods must be affixed to the outside of the mailpiece. Refer to the Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (ICAO) for air carrier operator variations.

Note: Mailable hazardous materials that are prohibited from air transportation may not be sent at the Express Mail, Priority Mail, or First-Class Mail rates.

- b. *Surface Transportation.* All mailable hazardous materials eligible to be sent at the Standard Mail rates must be prepared under the requirements that apply to surface transportation. A mailpiece containing a mailable hazardous material with postage paid at a Standard Mail rate must not, under any circumstance, be transported on air transportation.

Exhibit 326

Shipper's Declaration for Dangerous Goods (Sample Form)

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least two copies to the airline.)

Shipper 	Air Waybill No. Page of Pages Shipper's Reference Number <i>(optional)</i>						
Consignee 							
<i>Two completed and signed copies of this Declaration must be handed to the operator</i>	WARNING Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.						
TRANSPORT DETAILS This shipment is within the limitations prescribed for: <i>(delete non-applicable)</i>	Airport of Departure 						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">PASSENGER AND CARGO AIRCRAFT</td> <td style="width: 50%; padding: 2px;">CARGO AIRCRAFT ONLY</td> </tr> </table>	PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY	Airport of Destination: 				
PASSENGER AND CARGO AIRCRAFT	CARGO AIRCRAFT ONLY						
Shipment type: <i>(delete non-applicable)</i> <input type="checkbox"/> NON-RADIOACTIVE <input type="checkbox"/> RADIOACTIVE							
NATURE AND QUANTITY OF DANGEROUS GOODS							
Dangerous Goods Identification							
Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Subsidiary Risk	Quantity and Type of packing	Packing Inst.	Authorization
Additional Handling Information 							
24 hr. Emergency Contact Tel. No. _____							
I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.						Name/Title of Signatory Place and Date Signature <i>(see warning above)</i>	

327.2 Air Transportation Prohibitions

The following types of hazardous materials are prohibited from transport via aircraft (i.e., Express Mail, Priority Mail, or First-Class Mail rates) under any circumstances:

- a. Anything susceptible to damage or that can become harmful because of changes in temperature or atmospheric pressures unless protected against the effects of such changes.
- b. Magnetic material that has a field strength sufficient to cause a compass deviation at a distance of 7 feet or more from any point on the outer packaging.
- c. Flammable materials (gases, liquids, and solids).
- d. Radioactive materials.
- e. Hazardous materials excluded from air shipment by the regulations of 49 CFR 100–185, or by the applicable country or air carrier operator variations.

328 Postal Hazardous Materials Table

Appendix A, “Hazardous Materials Table: Postal Service Mailability Guide,” contains a modified version of the DOT Hazardous Materials Table found in 49 CFR 172.101. Appendix A lists the hazardous materials from 49 CFR and identifies eligibility for mailing in the domestic mail via air and surface transportation. The table can be used to determine the mailability of a hazardous material if the proper shipping name of the material is known. When only the UN number is known, Appendix B, “Numerical Listing of Proper Shipping Names by Identification (ID) Number,” can be used to locate a proper shipping name for cross referencing back to Appendix A.

The mailability information in Appendix A is based on DMM C023, the guidelines in this publication, and past postal mailability rulings. The table does not include specific information for international mail because almost all hazardous materials are prohibited in international mail. See Chapter 6 for the specific requirements that apply to international mail.

33 Hazard Classes

331 Nine Classes

Every hazardous material is assigned to one of nine hazard classes as defined in 49 CFR 172.101 and 173. The nine hazard classes are as follows:

- a. Class 1: Explosives.
- b. Class 2: Gases.
- c. Class 3: Flammable and Combustible Liquids.
- d. Class 4: Flammable Solids.
- e. Class 5: Oxidizing Substances, Organic Peroxides.

- f. Class 6: Toxic Substances and Infectious Substances.
- g. Class 7: Radioactive Materials.
- h. Class 8: Corrosives.
- i. Class 9: Miscellaneous Hazardous Materials.

Some of the nine classes are further separated into divisions based on their physical or chemical properties, as shown in Exhibit 331.

Exhibit 331 (p. 1)

DOT Hazard Classes and Postal Mailability

Class	Name of Hazard Class (and Division when applicable)	Domestic Mail		International Mail
		Air Transportation	Surface Transportation	
1	Explosives			
	Division 1.1: Mass Explosive Hazard	Prohibited	Prohibited	Prohibited
	Division 1.2: Projection Hazard	Prohibited	Prohibited	Prohibited
	Division 1.3: Fire and/or Minor Blast/Minor Projection Hazard	Prohibited	Prohibited	Prohibited
	Division 1.4: Minor Explosion Hazard	Prohibited	Only with prior HQ approval per 341	Prohibited
	Division 1.5: Very Insensitive With Mass Explosion Hazard	Prohibited	Prohibited	Prohibited
	Division 1.6: Extremely Insensitive; No Mass Explosion Hazard	Prohibited	Prohibited	Prohibited
2	Gases			
	Division 2.1: Flammable Gases	Prohibited	Only ORM-D material per 342	Prohibited
	Division 2.2: Nonflammable Gases	Only ORM-D material per 342	Only ORM-D material per 342	Prohibited
	Division 2.3: Toxic Gases	Prohibited	Prohibited	Prohibited
3	Flammable and Combustible Liquids			
	All Flammable Liquids	Prohibited	Only ORM-D material per 343	Prohibited
	All Combustible Liquids	Only ORM-D material per 343	Only ORM-D material per 343	Prohibited
4	Flammable Solids			
	Division 4.1: Flammable Solids	Prohibited	Only ORM-D material per 344	Prohibited
	Division 4.2: Spontaneously Combustible	Prohibited	Only ORM-D material per 344	Prohibited
	Division 4.3: Dangerous When Wet	Prohibited	Only ORM-D material per 344	Prohibited
5	Oxidizing Substances, Organic Peroxides			
	Division 5.1: Oxidizing Substances	Only ORM-D material per 345	Only ORM-D material per 345	Prohibited
	Division 5.2: Organic Peroxides	Only ORM-D material per 345	Only ORM-D material per 345	Prohibited

Exhibit 331 (p. 2)

DOT Hazard Classes and Postal Mailability

Class	Name of Hazard Class (and Division when applicable)	Domestic Mail		International Mail
		Air Transportation	Surface Transportation	
6	Toxic Substances and Infectious Substances Division 6.1: Toxic Substances	ORM-D material per 346; other poisons as permitted in 346.231	ORM-D material per 346; other poisons as permitted in 346.231	Prohibited
	Division 6.2: Infectious Substances	Only as permitted in 346	Only as permitted in 346	Only registered air letters per 622
7	Radioactive Material	Prohibited	Only per 347	Only registered air letters per 622
8	Corrosives (Liquids And Solids)	Only ORM-D material per 348	Only ORM-D material per 348	Prohibited
9	Miscellaneous Hazardous Materials	ORM-D material and other materials as permitted in 349	ORM-D material and other materials as permitted in 349	Prohibited, except for magnetized materials per 349 and 622.4

332 **Limited Quantity**

A *limited quantity* of a hazardous material is the maximum amount of a specific hazardous material exempted from the DOT labeling or packaging requirements in 49 CFR. To be eligible to be shipped under DOT's limited quantity provision, a hazardous material must be authorized an exemption in column 8A of the Hazardous Materials Table in 49 CFR 172.101. *Not every hazardous material is eligible to be shipped as a limited quantity.*

Under postal mailing rules, a material meeting the eligibility criteria for shipment as a limited quantity is mailable only if it can be further reclassified as an ORM-D material (see 333). Not every hazardous material permitted to be shipped as a limited quantity can qualify as an ORM-D material. Those that cannot are not eligible for mailing, except as specifically permitted in DMM C023 and this publication.

333 **ORM-D Materials**

Some of the hazardous materials that qualify under the limited quantity provision are permitted a further exemption in 49 CFR 172.101 (column 8A) to be reclassified as an ORM-D material under 49 CFR 173.144 and renamed with the proper shipping name "Consumer Commodity," which is defined in Appendix D. A mailable ORM-D material is additionally subject to

the mailability and quantity limits in DMM C023 and this publication, as applicable.

Most mailable hazardous materials fall within the ORM-D category. ORM-D materials present the lowest level of risk during transportation. The ORM-D category is unique to the United States. Its use is prohibited with international shipments of hazardous materials.

It is the responsibility of the mailer to know the correct hazard class of a hazardous material prior to mailing (see 323). In those instances where assistance is needed to determine eligibility for mailing, the mailer may request a ruling from the RCSC (see 215.2 and DMM C023.1.5).

334 **Small Quantity**

334.1 **Definition**

A *small quantity* is the maximum amount of a specific hazardous material that is not subject to any DOT requirements (i.e., packaging, marking, labeling) other than those in 49 CFR 173.4. *Not every hazardous material is eligible to be shipped as a small quantity.* Additionally, for postal purposes Class 7 materials are not permitted to be sent as a small quantity.

The DOT small quantity provision, like the DOT ORM-D category, is unique to the United States. Its use is prohibited with international shipments of hazardous materials and cannot be used in international mail.

334.2 **Mailability**

Hazardous materials in Class 3, Division 4.1, Division 4.2 (Packing Groups II and III only), Division 4.3 (Packing Groups II and III only), Division 5.1, Division 5.2, Division 6.1 (Packing Groups II and III only), Class 8, and Class 9 are eligible to be sent in the domestic mail under the small quantity provision only when each primary receptacle is limited to the following quantity, as applicable:

- a. 30 ml (1 oz) or less for liquids other than Division 6.1 (Packaging Group I) materials.
- b. 30 g (1 oz) or less for solids other than Division 6.1 (Packaging Group I) materials.
- c. 1 g (0.04 oz) or less for Division 6.1 (Packaging Group I) materials.

334.3 **Packaging and Marking**

Hazardous materials eligible to be shipped under the small quantity provision permitted in 49 CFR and 334.2 must be prepared following Packaging Instruction 10A in Appendix C. Each mailpiece that qualifies to be sent under the small quantity provision must be clearly marked on the address side with the following words: "This package conforms to 49 CFR 173.4."

335 **Packaging Requirements for Hazardous Materials**

335.1 **DOT Packing Groups**

Hazardous materials in Classes 1, 3–6, and 8–9 are assigned to a DOT packing group based on the degree of danger presented by the material during transport. The packing group assigned to a hazardous material is listed in column 5 of the Hazardous Material Table in 49 CFR 172.101 and in column (d) of Appendix A. Packing Group I indicates a great danger, Packing Group II a medium danger, and Packing Group III a minor danger.

335.2 **Postal Packaging Instructions**

For mailing purposes, the packaging of a mailable hazardous material must follow the appropriate Packaging Instruction in Appendix C. The correct Packaging Instruction to use for a specific hazardous material can be determined using Appendix A.

Mailers may not package or combine hazardous materials assigned to different hazard classes within a single mailpiece unless permitted by postal standard.

336 **Nonmailable Materials Found in the Mailstream**

When any mailpiece containing a nonmailable hazardous material is found in the mailstream, the procedures in POM 139.117 must be followed if the materials present an immediate threat to persons or property. The procedures in POM 139.118 are followed when there is no immediate threat to persons or property.

34 **Mailability by Hazard Class**

341 **Explosives (Hazard Class 1)**

341.1 **Definition**

An *explosive* is any substance or article, including a device, that is designed to function by explosion (i.e., an extremely rapid release of gas and heat) or that, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion, unless the substance or article is otherwise classed under the provisions in 49 CFR.

341.11 **Class 1 Divisions**

Hazard Class 1 has six divisions as follows:

- a. *Division 1.1* consists of explosives that have a mass explosion hazard. Examples are black powder, nitroglycerine (desensitized), dynamite, most types of torpedoes, and mercury fulminate.

- b. *Division 1.2* consists of explosives that have a projection hazard but not a mass explosion hazard. Examples are certain types of fireworks, some types of detonating fuses, and some types of ammunition.
- c. *Division 1.3* consists of explosives that have a fire hazard and either a minor blast or minor projection hazard or both, but not a mass explosion hazard. Examples are sodium picramate, some liquid and solid propellants, and some rocket motors.
- d. *Division 1.4* consists of explosives that present a minor blast hazard. Examples are common fireworks, toy caps, empty primed grenades, and some small arms ammunition.
- e. *Division 1.5* consists of very insensitive explosives that have a mass explosion hazard. Examples are type E blasting agents, some type B blasting agents, and very insensitive explosive substances.
- f. *Division 1.6* consists of extremely insensitive articles that do not have a mass explosion hazard.

341.12 **Class 1 Compatibility Codes**

Each division in Class 1 is further assigned a compatibility group code. The compatibility code consists of one letter (A–H, J–L, N, or S) that is positioned after the division number (e.g., 1.1A, 1.2C, 1.4S, etc.) and refers to the transportation and storage controls necessary to prevent potential hazards. See 49 CFR 173.52 for a more detailed description of the Class 1 compatibility codes.

341.2 **Mailability, Packaging, and Marking**

Explosives are generally prohibited from mailing under 18 U.S.C. 1716. The following conditions apply to the mailing of explosives:

- a. *International Mail.* All explosives are prohibited.
- b. *Domestic Mail via Air Transportation.* All explosives are prohibited.
- c. *Domestic Mail via Surface Transportation.* Generally, explosives are prohibited. The only exceptions are for Division 1.4S toy propellant devices and safety fuses that have been approved by the Manager, Business Mail Acceptance, USPS Headquarters, Washington, DC prior to mailing as stated in 341.22 and DMM C023.2.0.

341.21 **Nonmailable Explosives**

Nonmailable explosives found in the mailstream must be immediately reported in accordance with POM 139.117.

Nonmailable explosives include, but are not limited to, the following:

- a. *Common Fireworks.* Fireworks are classified as Division 1.1, 1.2, 1.3, or 1.4 explosives depending on the degree of hazard. Fireworks include roman candles, skyrockets, helicopter-type rockets, cylindrical and cone fountains, pyrotechnic wheels, illuminating torches, firecrackers, salutes, and combinations of items that are designed to produce any of the aforementioned types of effects. All types of fireworks are prohibited from mailing.

- b. *Fuses.* Fuses are classified as Division 1.3 or 1.4 explosives depending on the degree of hazard. All types of fuses (except safety fuses as permitted under 341.22) are prohibited from mailing.
- c. *Small Arms Ammunition.* Ammunition is classified as a Division 1.1, 1.2, 1.3, or 1.4 explosive depending on the degree of hazard. Ammunition that is regulated as a Class 1 explosive and designed to be fired from a pistol, revolver, rifle, or shotgun, as well as associated primers and blank cartridges (including those designed for tools) and propellant powder for use in any firearm, is prohibited from mailing.

341.22 Mailable Explosives

The following specific types of explosives may be mailed only when the applicable conditions are met. Full responsibility rests with the mailer to comply with DOT and Bureau of Alcohol, Tobacco, and Firearms (ATF) regulations before mailing.

- a. *Toy Propellant Devices.* The proper shipping name for a toy propellant device is “model rocket motor” or “igniters.” A toy propellant device assigned UN0454 or NA0323 and classed as a Division 1.4S explosive is eligible for mailing in domestic mail via surface transportation only when prior written permission has been obtained from the Manager, Business Mail Acceptance, USPS Headquarters, Washington, DC. A device approved for mailing is subject to the following conditions:
 - (1) Each device must be ignitable by electrical means only; contain no more than 62.5 g (2.23 oz) of propellant; and produce less than 80 newton seconds of total impulse with thrust duration not less than 0.050 second.
 - (2) Each device must be constructed so that all chemical ingredients are preloaded into a cylindrical paper or similarly constructed nonmetallic tube that does not fragment into sharp, hard pieces; must be designed so that it will not burst under normal conditions of use; must be incapable of spontaneous ignition under 500° F; and must not contain any type of explosive or pyrotechnic warhead other than a small, activation-charge parachute-recovery system.
 - (3) Each mailpiece containing approved devices must be prepared for mailing following Packaging Instruction 1A in Appendix C. A shipper’s declaration for dangerous goods is required.
- b. *Safety Fuses (UN0105).* Safety fuses consist of a core of black powder overspun with yarns, waterproofing compounds, and/or tapes. Safety fuses assigned UN0105 as a Division 1.4S explosive may be mailed in domestic mail via surface transportation only when prior written approval has been granted by the Manager, Business Mail Acceptance, USPS Headquarters, Washington, DC. Mailable safety fuses must be prepared using Packaging Instruction 1B in Appendix C. A shipper’s declaration for dangerous goods is required.

Note: “Fuses” are not to be confused with “fusees.” Fusees are rail and highway distress signals that are nonmailable Class 4 flammable solids.