

11

SAFETY RECOMMENDATIONS AND LEGAL REQUIREMENTS FOR
Transporting Pesticides in Pennsylvania

Significant changes in regulations affecting over-the-road transport of hazardous materials have made it important for every pesticide user to understand transportation hazards and procedures for minimizing the risks associated with them. Careless handling of containers, incorrectly maintained equipment, and unforeseen accidents can lead to pesticide leaks and spills during transport. Such events have the potential to injure or even kill humans and animals, pollute the environment, and lead to financial losses and legal actions.

Transportation Safety

Pesticides are transported from manufacturers to distributors and dealers, from retailers to end users, and from storage and mixing locations to application sites. Accidents can happen at any point in the chain, even when transport distances are short. Knowing how to prevent transportation mishaps and to properly respond when they occur could mean the difference between an annoying inconvenience and a community-scale disaster.

Transport vehicle

Pesticide transport vehicles for road and field vary widely in design and use, from bulk tankers and box trucks to pickup trucks and station wagons as well as self-propelled and pull-type sprayers. Some vehicles carry only formulated concentrates for delivery, others incorporate application equipment for premixed spray

solutions, and still others handle both. All, however, share basic common characteristics that affect safety and emergency response capabilities.

Transport vehicles should be in good mechanical condition, including power train, chassis, and any onboard bulk tanks and associated plumbing. In particular, make sure that safety and control components such as brakes, tires, and steering are in good working order. A poorly maintained vehicle is, by itself, a safety risk; adding pesticides to the picture increases the risk of injury or contamination should a mishap occur. Regularly inspect sprayer tanks, fittings and lines (especially those under pressure), and booms and nozzles. Look for structural defects, cracks, punctures, and other causes of leaks or failure.

Pesticides should never be carried in the passenger compartment of a vehicle because spilled chemical and hazardous fumes can seriously injure the occupants. In addition, spilled pesticides can be difficult or impossible to remove completely from interior upholstery. If pesticides must be carried in a station wagon, utility van, or similar enclosed vehicle, be sure to properly ventilate the cargo and passenger compartments, and keep passengers away from pesticides during transport. Since cargo can shift during collisions and other sudden stops, a safety barrier between the passenger and cargo areas is usually warranted.

The cargo area should be capable of securely holding containers and provide protection from tears, punctures, or impacts that could lead to container damage. Enclosed cargo boxes provide the greatest protection but are not always practical. They also offer the added protection of security from curious children, careless adults, or vandals. Open truck beds are more convenient for loading and unloading, but precautions must be taken to minimize the possibility of losing containers on sharp turns or bumpy roads. Flatbed trucks should have side and tail racks and tie-down rings, cleats, or racks to simplify the job of securing the load. Inspect the cargo area for nails, stones, or sharp edges/objects that could damage containers. Steel beds are preferable to wood since they are more easily cleaned if a spill should occur.

Vehicle operator

Transporting pesticides, whether in dilute or concentrate form, is serious business. In most cases, both the owner and the operator of the transport vehicle can be held responsible for any injuries, contamination, or damage resulting from a chemical release. The vehicle operator may be the only person capable of reacting to a spill or other mishap and, in some instances, may need to assist or instruct first response emergency personnel as they arrive on the scene.

Make sure the person assigned to transport pesticides for your business is mature enough to handle the responsibilities that

go along with the job and knowledgeable enough to perform them. At a bare minimum, the vehicle operator should understand the nature and hazards of the pesticides being transported, and safe and proper procedures for handling them. The operator should also be trained in basic emergency response procedures, including spill control and emergency notification procedures.

There may be special motor vehicle training and licensing or pesticide training and certification requirements for operators of pesticide transport vehicles. If the pesticides are labeled for agricultural use, the provisions of the EPA Worker Protection Standard require that drivers of vehicles transporting pesticides in anything but factory-sealed containers be trained as WPS pesticide handlers or be certified applicators. If the load meets the U.S. Department of Transportation (DOT) definition of a hazardous material or hazardous substance, then special driver training and, in some instances, commercial driver licensing is required. Details of these requirements are discussed later in the text.

Other safety precautions

Before loading pesticides and driving away, make sure that technical data for all products and emergency information for spill response are assembled and in the vehicle. A shipping paper (also called a vehicle manifest) may be required for certain products that are regulated as hazardous materials. Product labels and material safety data sheets (MSDSs) that are available at the time of purchase contain information about proper storage and handling of products, such as acceptable storage temperatures, human and environmental hazards, personal protective equipment, and emergency telephone numbers. This information should be in the vehicle to help the operator or emergency personnel properly respond to a spill or release of pesticide. A phone number in the vehicle for 24-hour emergency assistance (spill cleanup, etc.) is a good idea for all products and a legal requirement for some.

With cellular phone service now available in many areas, a mobile phone unit is a worthwhile investment for anyone

routinely involved in the transport of pesticides or working alone in remote locations. Carry a spill kit, either a commercial or self-assembled version, and personal protective equipment appropriate for the pesticides in transit. Train operators to use them properly. Be familiar with the travel route in order to anticipate and avoid problems, such as construction delays if possible. If a problem or accident occurs, it will be easier to deal with if the vehicle is not located in a major traffic jam.

Containers should be inspected prior to loading to be certain they are in serviceable condition, with legible and attached labels, tight closures, and pesticide-free outside surfaces. Handle containers carefully during loading to avoid rips and punctures. Inspect the vehicle cargo area for nails, stones, and sharp edges that could damage containers. Packing or shipping containers can be used to provide extra protection and secondary containment. Where practical, a synthetic liner or tarpaulin large enough to cover the floor and sides of the cargo area (especially truck beds) can provide containment and easier cleanup of spilled materials. Organize the load to maximize stability while at the same time maintaining access to containers for ease of unloading during the course of the day or the delivery route. The less containers are handled, the less likely they are to be damaged. Secure the load with tarps, ropes, brace bars, or other appropriate devices to prevent containers from shifting in the cargo area, and secure anything else that could damage a container during transport.

Protect chemicals from temperature extremes and moisture during transit. Extremely high or low temperatures (<40°F or >110°F) can alter the stability or effectiveness of some chemical formulations. Moisture can destroy paper and cardboard and promote rusting of metal containers. A waterproof cover can provide protection from the elements, including hot summer sun.

Do not allow people, pets, or livestock to ride in a cargo area loaded with pesticides. Food, livestock feed, seed, veterinary supplies, and plant materials should be kept separate from pesticides because

contamination may render them unusable or result in a poisoning incident. When possible, herbicides should be kept separate from fertilizers and other pesticides because of the potential for cross contamination. When pesticides must be transported with other materials in a single cargo area, use pallets or otherwise elevate the load to reduce the possibility of contaminating other products with pesticides in the event of an onboard leak or spill.

Never leave your vehicle unattended when transporting pesticides in an open vehicle. The owner and operator of the vehicle are responsible if curious children, careless adults, or vandals are poisoned or release pesticides that result in contamination or injury to other persons. If the cargo area cannot be locked, covering the load with a tarp can reduce the likelihood of tampering by unauthorized individuals.

Emergency procedures

If a spill or accident occurs, control the flow of material and contain it to prevent further spread. Clean up the spill as soon as possible. Be sure to wear the appropriate protective equipment. Always dispose of any waste materials properly. *Agrichemical Fact Sheet 5, How to Handle Chemical Spills*, outlines response procedures for handling chemical spills. It is available from The Pennsylvania State University, 112 Agricultural Administration Building, University Park, PA 16802 or a Penn State Cooperative Extension office.

If the spill is large or dangerous, have someone get help. Do not leave the site unattended. Operators should have radio or telephone communication available in the vehicle in the event they need to call for assistance. County emergency management offices can provide or coordinate assistance and regulatory compliance (dial 911 or check the blue pages of a directory) and are the first contact you should make in an emergency. In addition, CHEMTREC, a public service provided by the Chemical Manufacturers Association and its members, provides first responders, the transportation industry, medical professionals, and others with access to response information and technical assistance from chemical

industry experts for incidents involving hazardous materials. CHEMTREC's emergency phone number is 1-800-424-9300. This number is restricted for emergency assistance only. Regardless of whether assistance is required, the Pennsylvania Department of Agriculture requires that significant spills be reported to them. If spilled pesticides enter a watercourse, the Pennsylvania Department of Environmental Protection and the Pennsylvania Fish and Boat Commission require notification. The Local Emergency Planning Coordinator must also be notified if the pesticide spilled is listed as an Extremely Hazardous Substance and exceeds the Reportable Quantity as defined by Title III of SARA (Superfund Amendments Reauthorization Act), the Emergency Planning and Community Right-to-Know Act of 1986.

Department of Transportation (DOT) Regulations Affecting the Transport of Pesticides on Public Roadways

For the most part, regulations affecting pesticides fall under the authority of the amended Federal Insecticide, Fungicide, and Rodenticide Act of 1947. However, some pesticides meet the definition of U.S. Department of Transportation (DOT) hazardous materials (HM, hazmat) or SARA Title III hazardous substances and are subject to the special requirements of DOT hazardous materials regulations (49 CFR Parts 171–180) when being transported on public highways.

The DOT regulations are extensive and complex, addressing everything from live munitions to biological organisms to nuclear waste. The portions of the DOT regulations most pertinent to pesticide applicators and transporters are those that require training for vehicle operators sufficient to avoid and react to chemical spills, and communication of sufficient information to first-response emergency personnel to prevent their exposure or injury when responding to an incident. In this fact sheet, we will outline the requirements of the regulation and suggest a program for internal compliance monitor-

ing. However, this publication is not intended to be a complete DOT hazmat reference or to eliminate the need to understand the regulation in its entirety. It is simply a starting point for individuals attempting to understand compliance procedures. Figure 1 outlines the process for determining your own DOT hazmat compliance requirements.

Do you carry DOT-regulated materials?

The first and most important step is to determine if, in fact, you are transporting U.S. DOT-regulated materials in commerce. Commerce means anything related to business and, for all practical purposes, you should assume your activity fits the definition. The only legitimate exception would be the personal use of pesticides around the home or a hobby farm (no income generated). Regulated materials are defined as either hazardous materials by DOT or hazardous substances by EPA in SARA Title III. Note: There are many more DOT-regulated materials in addition to pesticides. Even if your pesticides do not meet these definitions, you may have other products that should be evaluated, such as solvents, fuels, or fertilizers.

Hazardous substances

Hazardous substances are those listed by EPA, but are regulated only if carried in both a quantity and concentration that exceeds EPA's specifications. Table 1 lists the pesticide active ingredients that EPA recognizes and the minimum quantity and concentration for each that meet the hazardous substance criteria. If you do not already know the active ingredients of the products you use, check the label for a list of ingredients and percentage composition. The following are examples of how to apply the information in Table 1 to the pesticides you use in your operation.

Example 1

Chlorpyrifos is the active ingredient for the insecticide Dursban Pro. According to the label, Dursban Pro contains 2 pounds of active ingredient (lb ai) per gallon, a 22-percent solution. The Dursban Pro label suggests spray solutions between 0.03 percent and 0.5 percent. The minimum regulated amount and concentration for chlorpyrifos listed in Table 1 are 1.0 pound of active ingredient and a 0.002

percent (20 ppm) concentration. Both of these criteria must be met for the load to be DOT-regulated.

If you are transporting undiluted 22 percent concentrate, which exceeds the 0.002 percent concentration standard, then any amount at or above a half gallon (1 lb ai) is a DOT-regulated hazardous substance, because

$$\frac{1 \text{ lb ai (from Table 1)}}{2 \text{ lb/gal formulation}} = 0.5 \text{ gal}$$

If you are transporting mixed spray solution, then you must calculate the concentration and amount of active ingredient in your tank and compare them to Table 1 in order to determine if the load is regulated. If you mixed according to label directions, then the concentration of your spray solution will be between 0.03 percent and 0.5 percent active ingredient, and this entire range is above 0.002 percent. If you know the concentration of the solution, then calculate the amount of active ingredient in the tank by the following formula:

$$\text{lb ai} = \frac{\% \text{ a.i.} \times \text{gallons of solution} \times 8.34 \text{ lb/gal H}_2\text{O}}{100}$$

For 100 gallons of 0.03 percent solution,

$$\frac{0.03 \% \text{ a.i.} \times 100 \text{ gal} \times 8.34 \text{ lb/gal}}{100} =$$

0.25 lb ai.

Alternatively, you could calculate the amount of active ingredient in the tank by simply multiplying the product formulation (2 lb/gal) by the amount of product you added to the mix (1 pint, or 0.125 gal, in 100 gal) to get the same answer.

$$2 \text{ lb/gal formulation} \times 0.125 \text{ gal product} = 0.25 \text{ lb ai.}$$

In either case, 0.25 pound is below the 1 pound threshold, so this load would not be regulated. For 100 gallons, this mixture would need to be at least four times as

concentrated (4 x 0.03%, or 0.12%) to be regulated (> 1 lb ai). Similarly, 4 x 100 gallon (400 gal) of 0.03 percent solution would also be regulated because the total active ingredient is 4 x 0.25 (or 1.0) lb ai. If you know the amount of active ingredient added to the spray mix, you can calculate the concentration of the solution in a similar fashion by dividing the amount (weight) of the active ingredient by the weight of the water carrier and multiply by 100.

$$\% \text{ ai} = \frac{\text{lb ai}}{\text{gal of water} \times 8.34 \text{ lb/gal H}_2\text{O}} \times 100$$

Hazardous materials

Hazardous materials are broadly classified by their toxicity, reactivity, flammability, and/or corrosivity characteristics. With few exceptions, pesticide products that are classified as hazardous materials are so designated because of their flammability (particularly ECs) or toxicity characteristics. Table 2 lists the pesticides and a few fertilizers and fuels that pesticide applicators commonly carry and that DOT recognizes as often fitting the definition of a hazardous material. Note that in the case of hazardous materials, pesticides are often listed by chemical family rather than a specific active ingredient. Also, the category “pesticides, n.o.s. (not otherwise specified)” includes any product with an EPA registration number. Unlike hazardous substances, it is the characteristic of the product in transit, not its name, that is important for proper classification as a hazardous material. More importantly, it is the characteristics of the form of material you are transporting—for instance, mixed spray solution, impregnated fertilizer, formulated concentrate—not the active ingredients, that dictate the hazard class. For example, undiluted EC formulations of insecticides are often classified as hazardous materials by virtue of their flammability or toxicity characteristics. These same products, after dilution in water according to label directions, often no longer meet the definition of a hazardous material. Table 3 includes abbreviated descriptions of the various hazardous material classifications that can apply to pesticides, along with their defining characteristics. The assignment of hazard zones and packing groups to some hazardous material classes further defines

the degree of danger associated with specific products and the precautions that should be observed when handling them. Determining these characteristics or, more specifically, the regulatory status for the products you carry will require some research on your part. In many cases, the first place to look for this information is the product’s material safety data sheet (MSDS), especially if you are transporting formulated products in original containers. Many MSDSs include DOT shipping requirements (usually the last section of the MSDS). However, there is no requirement for the manufacturer to include this information on the MSDS. If the MSDS does not contain this information, try contacting the manufacturer directly or the retailer. Since both engage in transporting the product, they should be able to supply you with the necessary information. If none of these sources is productive, check the chemical and physical data on the MSDS against the hazard class characteristics in Table 3 to determine the regulatory status of your product. If you transport spray solutions or pesticides altered in any way from their original concentration, you will need to inquire with the manufacturer about the characteristics of your mixture.

All regulated hazardous substances are automatically defined as Class 9 Miscellaneous hazardous materials if they do not meet the definition of some other hazard class. For instance, we demonstrated in a previous example that Dursban Pro 22 percent concentrate is a regulated hazardous substance when transported in quantities greater than 0.5 gallon. It is also a Class 6.1 poisonous material (in any quantity) because, according to the MSDS, the inhalation LC50 for Dursban Pro is ≤ 10 mg/kg. It is important to be able to make the determination of hazardous substance, hazardous material, or both because the complete and correct information must be entered on the shipping paper.

Determining the legal status of transported chemicals is the first and most important step in complying with complex DOT regulations. If your research indicates that the products you carry are not regulated by DOT under the HM regulations, no further action on your part is necessary. However, remember to repeat the process for each

new product that you use in your operation. If, on the other hand, you determine that you are transporting regulated substances on public roads, read on. The next section describes the basic responsibilities of all hazmat transporters and briefly outlines additional requirements for transporters of especially large or dangerous loads.

Basic requirements for HM transporters

If you determine that you are a transporter of hazardous substances and hazardous materials, the DOT regulations with the most significant impact on your operation are commonly known as HM-126F (driver training) and HM-181 (shipping procedures). All transporters of hazardous materials (including hazardous substances) must comply with these basic requirements. HM-126F describes which employees must be trained, the content of their training program, the timing and frequency of training, and recordkeeping responsibilities. Shipping procedures regulated under HM-181 include proper shipping papers, access to 24-hour emergency assistance, and proper packaging, including marking and labeling, for the product in question.

Reminder: *This section is not an official or complete summary of the DOT regulations. Therefore, it should not substitute for some official documentation from DOT. In Pennsylvania, contact the Pennsylvania Department of Transportation, Hazardous Materials Section, Motor Carrier Safety Division, Room 215, Transportation and Safety Building, Harrisburg, PA 17120 for further assistance. The telephone number is (717) 787-7445.*

HM-126F: Driver training program outline

HM-126F mandates that any (hazmat) employee who prepares, loads, transports, sells, tests, packages, or performs similar activities with a hazardous material receive hazardous materials transportation training. This regulatory requirement is designed to increase safety awareness and improve emergency preparedness for responding to transportation incidents and

accidents. The hazmat training may be done in-house or by outside sources. Basic requirements for hazmat training include:

- General awareness training for all hazmat employees to familiarize them with the hazmat regulations so they can recognize hazardous materials and understand the hazard communication requirements, label directions, MSDSs, and shipping forms. The DOT hazard communication requirement is not the same as the OSHA requirement, but instead establishes uniform standards for vehicle placarding, package labeling, marking, and shipping papers.
- Function-specific training so that each hazmat employee is able to comply with hazmat regulations in each specific task they perform, such as a truck driver responding to a spill.
- Emergency response training, including emergency response procedures and first aid, for all hazmat employees who handle or transport packages containing hazardous materials (such as warehouse workers and drivers).
- Basic safety training for vehicle drivers covering package handling, exposure precautions, and other nonemergency chemical safety procedures.

In addition, employers of these individuals must maintain records of their training for the previous two years. Records must include the employee's name, date of training, description (or copy or location) of the training materials, the name and address of the trainer, and certification that hazmat training and testing has been completed. Several trade associations and consulting organizations have developed hazardous materials training programs to help commercial transporters comply with these regulatory requirements. In addition to those listed below, check your state and national associations for information and resources for training programs. This is not an inclusive list; there may be other commercial sources of training program materials.

- U.S. Department of Transportation Hazardous Materials Information Center: 1-800-467-4922
- J.J. Keller & Associates: 1-800-327-6868

- American Transportation Association
1-800-ATA-LINE

HM-181: Shipping procedures

In addition to the training requirement, transporters of DOT-regulated materials must follow specific procedures for filling out and carrying shipping papers, identifying 24-hour emergency contacts, and correctly choosing shipping packages, as well as their marking and labeling. Each vehicle operator must have a shipping paper readily available at all times. It must log the hazardous materials originally loaded on board the vehicle. The shipping paper can also log unregulated materials. DOT does not require the driver to update the shipping paper throughout the day to reflect delivery or partial off-loading. The shipping paper must be within hands reach of the driving position with the seat belt fastened and must be in sight. Generally, on the seat or in the map pocket of the driver's door are acceptable, while in the glove compartment or under the seat are not acceptable locations for the shipping paper. No specific form for the shipping paper is required by DOT. A generic sample shipping paper that you can adapt to your own needs appears at the end of this document (Figure 2). Regardless of the form you choose to use, it must contain the following information:

- Proper shipping name of the material from the hazardous materials table (49 CFR Part 172.101)
- For regulated materials, an "X" or "RQ" (for hazardous substances only) in a column directly to the left of the proper shipping name
- The hazard class or division number
- The four-digit UN identification number
- Packing group in Roman numerals
- The quantity of material on board by weight or volume
- Company name, address, and contact person, the vehicle ID number, and the date
- A 24-hour emergency number

The first five items in the preceding list originate from the hazardous materials table of 49 CFR Part 172.101, but are hopefully available instead from the MSDS sheet or the manufacturer. The 24-hour emergency number must have a knowledgeable person standing by at all

times. An answering machine or answering service is not adequate. Many pesticide manufacturers list a 24-hour emergency number on the label or MSDS, but these are almost exclusively for that company's products. Such a number would not be acceptable for loads containing products from more than one manufacturer. Many commercial transporters use CHEMTREC's 24-hour emergency response service as their 24-hour contact. However, this is a for-fee service that must be contracted from CHEMTREC. If you use their number without authorization and an emergency response official calls CHEMTREC, you will be in violation of DOT regulations and be considered out of compliance.

In addition to the 24-hour emergency response telephone number on the shipping paper, DOT requires that basic emergency response information, such as that contained on the MSDS, be carried in the vehicle with the shipping paper(s). This information must include the basic description and technical name of the product as it appears on the shipping paper, acute health hazards, preliminary first aid procedures, and emergency response procedures for incidents both with and without fire.

With the exception of most premixed pesticide solutions transported in small, manually operated sprayers, the packaging of hazardous products is also regulated by DOT, including specifications for container design and construction and proper marking and labeling of packages. In our hazmat context, a container refers to any vessel holding a DOT-regulated product, be it a 1-liter plastic bottle or a stainless steel tank hauled by a semi rig. As implied by the different Packing Groups referenced in Table 3, container specifications become more rigorous as the hazards associated with a particular product or use increase. Once properly loaded in a container, packages must be appropriately marked and/or labeled so the hazards associated with their contents are easily determined through visual inspection by knowledgeable persons. Package marking and labeling requirements vary, but generally include proper placement on the package, proper shipping names, UN identification numbers, hazard classes,

proper package orientation (e.g., “This side up”), specific hazards (oxidizer, flammable, etc.), and other important safety or hazard information.

Concentrated pesticide formulations should be transported in their original containers to ensure that they are in compliance with DOT container design and construction specifications. The specifications are complex and oriented towards engineers and container manufacturers, not commercial pesticide applicators. When purchasing large-volume tanks for mixed pesticide solutions, have the dealer show you evidence of DOT approval for the tank and its intended use. The DOT designation will be stamped somewhere on the tank. Don’t purchase the tank for this purpose if the seller cannot provide you with this evidence. If you are constructing a tank, refer to 49 CFR Part 173 for specifications applicable to your intended use.

Due to the variation in marking and labeling requirements for the many pesticide products transported in commerce, it is beyond the scope of this document to provide the details of these topics here. In fact, the use of original containers with original marking and labeling as provided by shippers and manufacturers is strongly encouraged and avoids the need to become an authority on this subject. Usually this will mean transporting bottles or jugs in their original cases rather than loose, even where convenience might suggest otherwise. Most shippers of regulated products have professionally trained staff to ensure that packages are properly marked and labeled as required by DOT. In the event that you choose to break cases and transport individual loose containers, be sure to carefully reproduce any and all marking and labeling present on the original case or, in the case of agricultural operations, refer to 49 CFR Part 173.5 for the specific exemptions allowed.

Vehicle placarding and commercial driver licensing
So far, the DOT regulations we have covered apply to all transporters of hazardous products, regardless of quantity, hazard class, or any other technical consideration. Additional requirements, specifically vehicle placarding and related

procedures, apply to transporters of large quantities of hazardous materials or of any quantities of certain extremely dangerous substances. Placards are simply rectangular signs that identify the hazard class code and its associated hazard, such as 6.1/Poison. The regulations specify placard size, shape, color, symbol, location on the vehicle, and other important requirements. Vehicle placarding is required if you transport any of the following:

- *Greater than 1,000 lb (454 kg) in a single container/package of any hazardous material or of any mixture containing a hazardous material*
- *Any quantity of hazardous material in a permanently fixed tank with a capacity of greater than 119 gal (450 l)*
- *Any quantity of a class 1 (explosive) or class 2.3 (poisonous gas) hazardous material. (While these classifications rarely apply to pesticides, fumigants containing methyl bromide are classified as 2.3 Poisonous Gases.)*

If the contents of your load require you to placard your vehicle, you are automatically required to qualify for and obtain a commercial driver license (CDL) with hazmat endorsement. In addition, you must register your business with either the state DOT (if your vehicles never cross state lines) or the U.S. DOT (if they do cross state lines). There are other circumstances that might require a CDL, such as gross vehicle weights in excess of 26,000 pounds or the operation of an articulating vehicle. Even if you already possess a CDL, you still must obtain the additional hazmat endorsement.

The details of placarding, CDLs, and DOT registration are beyond the scope of this document. Contact your state DOT for additional information if you determine that your transportation activity requires you to comply with these regulations.

Transporting pesticides and other hazardous materials is serious business with potentially serious consequences for those who don’t know proper procedures or don’t follow the law. Don’t be a hazard on the road. Accepting your responsibilities as an operator and instilling those values in your employees is the key to preventing dangerous mishaps on the road.

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Figure 1. Flow chart for determining Department of Transportation regulatory requirements (excludes hazardous waste).

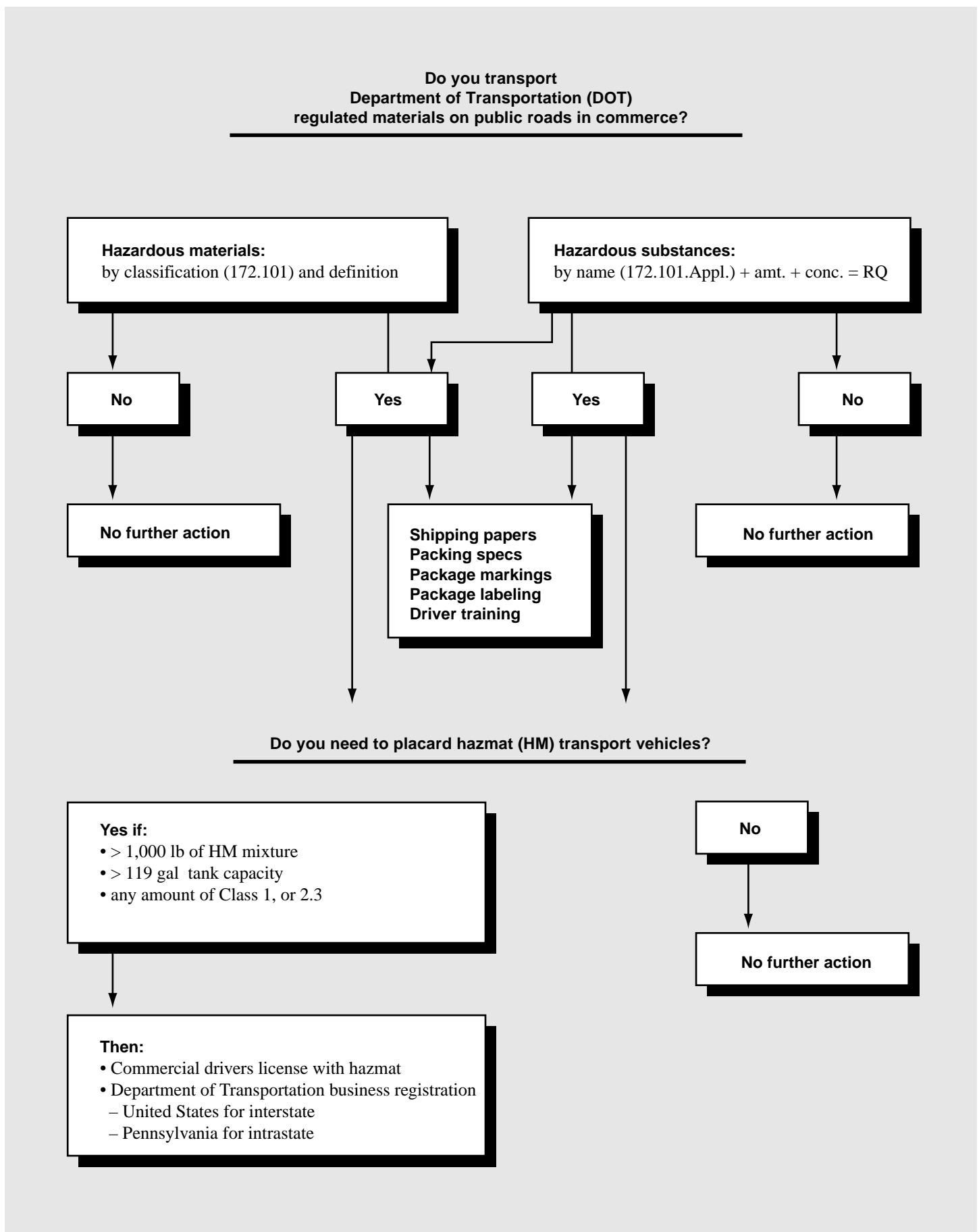


Table 1. Pesticides classified as U.S. DOT hazardous substances (from 49 CFR Part 172.101).

Pesticide active ingredients	Reportable quantities(RQ)		Pesticide active ingredients	Reportable quantities(RQ)	
	lb (kg)	% by wt (ppm)		lb (kg)	% by wt (ppm)
Acrolein	1 (0.454)	0.002 (20)	Diuron	100 (45.4)	0.2 (2000)
Aldrin	1 (0.454)	0.002 (20)	Endosulfan	1 (0.454)	0.002 (20)
Aldicarb	1 (0.454)	0.002 (20)	Endrin	1000 (454)	2 (20,000)
Aluminum phosphide	100 (45.4)	0.2 (2000)	Ethion	10 (4.54)	0.02 (200)
Azinphos methyl	1 (0.454)	0.002 (20)	Famphur	1000 (454)	2 (20,000)
Warfarin and salts	100 (45.4)	0.2 (2000)	Formaldehyde	100 (45.4)	0.2 (2000)
Lindane	1 (0.454)	0.002 (20)	Heptachlor	1 (0.454)	0.002 (20)
Captan	10 (4.54)	0.02 (200)	Malathion	100 (45.4)	0.2 (2000)
Carbaryl	100 (45.4)	0.2 (2000)	Maleic hydrazide	5000 (2270)	10 (100,000)
Carbofuran	10 (4.54)	0.02 (200)	Methomyl	100 (45.4)	0.2 (2000)
Carbon disulfide	100 (45.4)	0.2 (2000)	Methoxychlor	1 (0.454)	0.002 (20)
Carbon tetrachloride	10 (4.54)	0.02 (200)	Methyl bromide	1000 (454)	2 (20,000)
Chlordane	1 (0.454)	0.002 (20)	Methyl parathion	100 (45.4)	0.2 (2000)
Chloroform	10 (4.54)	0.02 (200)	Mevinphos	10 (4.54)	0.02 (200)
Chlorpyrifos	1 (0.454)	0.002 (20)	Naled	10 (4.54)	0.02 (200)
Coumaphos	10 (4.54)	0.02 (200)	Napthalene	100 (45.4)	0.2 (2000)
Creosote	1 (0.454)	0.002 (20)	Parathion (ethyl)	10 (4.54)	0.02 (200)
2,4-D	100 (45.4)	0.2 (2000)	Parachloronitrobenzene (PCNB)	100 (45.4)	0.2 (2000)
Diallate	100 (45.4)	0.2 (2000)	Phenyl mercuric acetate (PMA)	100 (45.4)	0.2 (2000)
Diazinon	1 (0.454)	0.002 (20)	Phorate	10 (4.54)	0.02 (200)
Dicamba	1000 (454)	2 (20,000)	Pronamide	5000 (2270)	10 (100,000)
Dichlobenil	100 (45.4)	0.2 (2000)	Pyrethrins	1 (0.454)	0.002 (20)
Dichloropropane	1000 (454)	2 (20,000)	2,4,5-T	1000 (454)	2 (20,000)
Dichlorvos	10 (4.54)	0.02 (200)	Thiram	10 (4.54)	0.02 (200)
Dicofol	10 (4.54)	0.02 (200)	Toxaphene	1 (0.454)	0.002 (20)
Dieldrin	1 (0.454)	0.002 (20)	2,4,5-TP	100 (45.4)	0.2 (2000)
Dimethoate	10 (4.54)	0.02 (200)	Trichlorfon	100 (45.4)	0.2 (2000)
Diquat	1000 (454)	2 (20,000)	Zinc phosphide	100 (45.4)	0.2 (2000)
Disulfoton	1 (0.454)	0.002 (20)			

Table 2. U.S. DOT hazardous material classifications for pesticides (from 49 CFR Part 172.101).

Compound	HM Classification	
Aldrin	6.1	Poisonous material
Anhydrous ammonia	2.2	Nonflammable compressed gas
Ammonium nitrate fertilizers	5.1	Oxidizer
Ammonium nitrate mixed fertilizers	5.1	Oxidizer
Arsenical pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Benzoic acid derivative pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Bipyridilium pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Cacodylic acid	6.1	Poisonous material
Cadmium compounds	6.1	Poisonous material
Calcium arsenate	6.1	Poisonous material
Calcium hypochlorite	5.1	Oxidizer
Carbamate pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Carbon dioxide	2.2	Nonflammable compressed gas
CO ₂ /ethylene oxide mixtures	2.1	Flammable gas
	2.2	Nonflammable compressed gas
	2.3	Poisonous gas
Carbon disulfide	3	Flammable/combustible liquid
Carbon tetrachloride	6.1	Poisonous material
Chloropicrin	6.1	Poisonous material
Chloropicrin/methyl bromide mixtures	2.3	Poisonous gas
Chloropicrin mixtures, not otherwise specified (n.o.s.)	6.1	Poisonous material
Compounds, tree or weed killing	8	Corrosive material
Consumer commodities	ORM-D	(other regulated material)
Copper-based pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Coumarin-derived pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Diesel fuel	3	Flammable/combustible liquid
	6.1	Poisonous material
Dithiocarbamate pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Environmentally hazardous substance	9	Miscellaneous
Ethylene dibromide (EDB)	6.1	Poisonous material
EDB/Methyl bromide	6.1	Poisonous material
Ethylene dichloride	3	Flammable/combustible liquid
Formaldehyde solutions	9	Miscellaneous
	3	Flammable/combustible liquid
Gasoline	3	Flammable/combustible liquid
Insecticide gases	2.1	Flammable gas
	2.2	Nonflammable compressed gas
	2.3	Poisonous gas

continued on next page

Table 2. continued

Compound	HM Classification	
Maneb (>60%)	4.2	Spontaneously combustible
	4.3	Dangerous when wet material
Mercury-based pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Methyl bromide	2.3	Poisonous gas
Methyl parathion	6.1	Poisonous material
Nicotine compounds	6.1	Poisonous material
Organochlorine pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Organophosphorous pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Organtin pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Parathion (ethyl)	6.1	Poisonous material
Pesticide, n.o.s.	3	Flammable/combustible liquid
	6.1	Poisonous material
Phenoxy pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Phenyl urea pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Phosphine	2.3	Poisonous gas
Sodium hypochlorite	5.1	Oxidizer
Sodium pentachlorophenate	6.1	Poisonous material
Substituted nitrophenyl pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Sulfur	9	Miscellaneous
Triazine pesticides	3	Flammable/combustible liquid
	6.1	Poisonous material
Zinc phosphide	4.3	Dangerous when wet material

Table 3. Defining characteristics of U.S. DOT hazardous materials that include pesticides.

HM class codes	HM class name	Defining characteristics
2.1	Flammable gas	Ignites in standard atmospheric conditions
2.2	Nonflammable compressed gas	>41 PSI at room temperature
2.3	Poisonous gas	LC50 < 5000; otherwise known toxins
	Hazard zone A	LC50 < 200
	Hazard zone B	200 > LC50 < 1000
	Hazard zone C	1000 > LC50 < 3000
	Hazard zone D	3000 > LC50 < 5000
3	Flammable liquid	Flash point < 141 F (60.5 C)
	Combustible liquid 141 F > flash point < 200 (93 C)	
	Packing group I	Boiling point < 95 F
	Packing group II	Flash point < 73 F (23 C)
	Packing group III	73 F > flash point < 141 F
4.2	Spontaneously combustible material	
	Packing group I	Ignites in < 5 minutes in air
	Packing group II	Self-heating
4.3	Dangerous when wet material	
	Packing group I	Spontaneously flammable when wet
	Packing group II	Flammable or toxic fumes when wet
5.1	Oxidizer	
	Packing groups I/II/III	According to standard chemical tests
6.1	Poisonous material	Liquid w/ oral LD50 < 500
		Solid w/ oral LD50 < 200
		Dermal LD50 < 1000
		Inhalation (dust/mist) LD50 < 10
	Packing group I	Oral LD50 < 5
		Dermal LD50 < 40
		Inhalation LD50 < 0.5
	Packing group II	5 > oral LD50 < 50
		40 > dermal LD50 < 200
		0.5 > inhalation LD50 < 10
	Packing group III	Solid w/ 50 > oral LD50 < 200
		Liquid w/ 200 > oral LD50 < 500
		200 > dermal LD50 < 1000
		2 > inhalation LD50 < 10
8	Corrosive material	By std. skin and metal corrosivity tests
	Packing group I	Irreversible skin damage in < 3 minutes
	Packing group II	Irreversible skin damage in < 60 min
	Packing group III	Irreversible skin damage in < 4 hours
		or by std. metal corrosivity tests
9	Miscellaneous hazardous material	SARA III hazardous substances
		Others known as anesthetic, noxious, etc
ORM-D	Other regulated material	Consumer commodities
		Other classes in small quantities

Figure 2. A generic sample shipping paper that you can adapt to your own needs.

Sample Shipping Paper

Page 1 of #

Company Name

Company Address

Emergency response information: 24-hour telephone number

HM	Basic description	Amt	Comments
X	Proper shipping name (+ technical name for n.o.s. materials), hazard class/division, UN ID#, packing group in Roman numerals		
X or RQ	RQ, environmentally hazardous substance, liquid/solid n.o.s. (+ hazardous substance name), 9, UN ID#, III		
X or RQ	RQ, proper shipping name (+ hazardous substance name if applicable), hazard class/division, UN ID#, packing group in Roman numerals		
	Other unregulated materials		