EXTENSION PUBLICATIONS

UNIVERSITY of HAWAI'I at MĀNOA
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESILIENCE

Safe Transport of Pesticides for Landscape Professionals

At a Glance: Landscape professionals often need to move pesticides, whether from storage to a job site or between properties. This publication by the College of Tropical Agriculture and Human Resilience, University of Hawai'i at Mānoa, provides recommendations on how to safely transport pesticides, complying with regulations and following best practices to protect pesticide handlers, members of the public, and the environment.

Figure 1. The bed of a truck loaded with pesticides. **(A)** Side view of the truck. Note the personal protective equipment (PPE), decontamination kit, Safety Data Sheet, label and emergency phone numbers in the cab where they will not be contaminated in event of a spill in the bed of the truck. A locked box in the bed would be another option for keeping PPE clean in case of a spill. **(B)** The bucket contains concentrated pesticides in their original containers. The trash can contains a mixed backpack sprayer at less than 2% dilution of a Class 9 Packing Group III material such as Quali-Pro Abamectin 0.15 EC Miticide/ Insecticide, EPA Reg. No. 53883-371, by Control Solutions Inc. (DOT PHMSA n.d.-b [49 CFR 173.6]; Control Solutions Inc. n.d.). Photos: Mark Dragich

Introduction

When making decisions about pesticide use, most of the focus usually goes toward picking the right product and applying it correctly, but getting the product to the site safely matters just as much (Figure 1). Spills and leaks in the truck bed, loose containers, or confusion about transportation rules can create problems for workers, the public, and the environment.

Several agencies regulate different aspects of pesticide handling. Knowing which agency and which section(s) of the Code of Federal Regulations (CFR) govern which parts of the process can help clarify what details need to be checked before transporting a pesticide product. To help mitigate risk and ensure regulatory compliance, it's important to understand many different pieces of information. These include:

October 2026

Subject Category: Pesticide Risk Reduction Education, PRRE-14

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- Safety Data Sheets (SDSs)
- Pesticide labels and associated laws regulated by the U.S. Environmental Protection Agency (EPA) in 40 CFR Parts 150-180 (EPA n.d.-a)
- Laws regulated by the U.S. Department of Transportation (DOT) in 49 CFR Parts 100-185 (DOT PHMSA n.d.-a)
- Laws regulated by Occupational Safety and Health Administration in 29 CFR 1900.1200 (OSHA n.d.)
- Best practices

This publication takes a closer look at how these pieces of information connect and what they mean for everyday landscape work. Throughout this publication, excerpts from a pesticide label and a Safety Data Sheet are used as examples to guide landscape professionals on what to do and where to find important information. As noted below in the Disclaimer section, discussion of named products does not represent a recommendation or endorsement of these products by the authors or the College of Tropical Agriculture and Human Resilience, University of Hawai'i at Mānoa (UHM CTAHR). Moreover, discussion of the products named in this publication does not represent an endorsement of UHM CTAHR or its publications by the manufacturers of the those products.

Staying Compliant with Laws Relating to Pesticide Transport

Getting familiar with the label and Safety Data Sheet before a product is purchased, handled, and transported to a job site is critical, as compliance is required and potential incidents can occur as soon as you take possession of a pesticide. Federal law requires that pesticides be used exactly as directed (EPA n.d.-e). That responsibility goes beyond pesticide application and includes mixing, loading, storage, and transport.

Pesticide Labels

Before loading the pesticide onto the bed of a truck, read the whole label thoroughly to understand all requirements that may apply to the use of the product, including what Personal Protective Equipment (PPE) is required, and make sure the SDS is accessible to the pesticide handler. Many pesticides have a statement in the storage and disposal section of the label that prohibits decanting the contents into another container for storage (Figure 2), so read this section of the label carefully. If secondary or service containers are to be used, make sure they comply with all laws and regulations, because the DOT and EPA requirements may be different. Be sure to read and follow the instructions on the pesticide label, as this is a legal requirement (EPA n.d.-b [40 CFR 170.317]). The EPA recommends that any labeling of secondary and service containers includes the following information (EPA n.d.-c):

- The name, address, and telephone number of the applicator/pest control firm (if applicable);
- Product name;
- EPA registration number;
- Name and percentage of active ingredient;
- If the product in the container is diluted, follow the name and percentage of active ingredient with the phrase: *"The product in this container is diluted as directed on the pesticide product label."*
- Signal word and precautionary statements (including First Aid statements) from the registered label unless the registrant has acute toxicity data supporting lesser precautionary statements for the diluted product, and alternate directions for the diluted product are indicated on the product label; and
- The statement: *"Follow the directions for use on the pesticide label when applying this product."*

Safety Data Sheets and EPA Regulations

Before transporting a pesticide, it is important to understand what kind of chemical is being handled and how to handle it. To assist this, every chemical sold in the United States must have a Safety Data Sheet (SDS) as dictated by 29 CFR 1910.1200 (OSHA 2012; OSHA n.d.

Figure 2. Excerpt from the storage and disposal section of the Admire Pro Systemic Protectant label, EPA Reg. No. 264-827. Note that storage in secondary or service containers is not permitted (highlighting). Source: Bayer CropScience LP (n.d.)

Figure 3. Section 3 of the SDS for Quali-Pro Abamectin 0.15 EC, EPA Reg. No. 53883-371. Note that each ingredient has a CAS (Chemical Abstracts Service) number listed. Source: Control Solutions Inc. (2020)

SECTION 3: COMPOSTION/INFORMATION ON INGREDIENTS

Chemical Name	CAS Number	Weight %
N-methyl-2-pyrrolidone	872-50-4	19.0 – 25.0%
Hexyl alcohol	111-27-3	9.0 – 12.0%
2-ethylhexanol	104-76-7	9.0 – 12.0%
Abamectin	71751-41-2	1.9%
Butylated Hydroxytoluene	128-37-0	0.5 – 2.0%

*Ingredients not listed or listed with a weight % range are considered a trade secret and are withheld under 29 CFR 1910.1200(i).

[29 CFR 1910.1200]). In the SDS, there are different sections that pertain to different regulatory agencies and the laws they enforce. Section 2 of the SDS pertains to OSHA laws, which are deferred to EPA-regulated laws and state pesticide laws when the chemical product is a pesticide (Goto 2017; HIOSH n.d.). Section 3 of the SDS (Figure 3) lists the active ingredient along with its CAS (Chemical Abstracts Service) number, which is the unique identifier used in regulatory databases (Control Solutions Inc. 2020).

The CAS number becomes important when trying to determine if the ingredient appears on EPA's **Consolidated List of Lists** (EPA OLEM 2025). This list is tied to federal environmental laws such as the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which are designed to ensure that communities and emergency responders are informed and protected from significant chemical hazards, as well as the responsibility for cleanup (EPA n.d.-f). These laws only require reporting when certain chemicals are stored (Threshold Planning Quantities [TPQs]) or released above specific thresholds (Reportable Quantities [RQs]) (EPA OLEM 2025). When checking whether a pesticide ingredient falls into that category, the CAS number in Section 3 is used. Chemicals with names that are similar or even identical can have different CAS numbers because they differ in formulation, physical state, or other characteristics (Ellegaard and Wallin 2013).

If a chemical appears on the EPA List of Lists it may have an RQ or a TPQ. The RQ is the amount that, if released into the environment, must be reported to the EPA's **National Response Center** at the federal level and the **Hazard Evaluation and Emergency Response Office of the Hawai'i Department of Health (HEER)** at the state level (EPA n.d.-d; DOH HEER n.d.). A spill that exceeds the RQ threshold must be reported immediately. TPQ refers to the amount that triggers emergency planning requirements for stored chemicals in inventory. Most landscape products don't fall into this category, but TPQ should be checked prior to transport (EPA OLEM 2025).

Safety Data Sheets and DOT Regulations

Section 14 of the SDS determines whether a pesticide is regulated as a hazardous material during transport. Some products are listed as "not regulated" for ground transport when carried in typical service quantities. Others may be assigned a UN (United Nations) number, hazard class, and packing group if transported in larger volumes, which places them under U.S. Department of Transportation hazardous materials regulations (DOT PHMSA n.d.-c [49 CFR Part 173]). These regulations require additional compliance, including minimum insurance, a manifest, GHS placarding, Commercial Driver's License (CDL) with Hazardous Materials (HAZMAT) Endorsement, packaging, HAZMAT training, and more (DOT FMCSA n.d.).

In the example from Figure 4, the SDS provides transportation classification information which includes the UN number, hazard class, and packing group. The product mentioned is a chemical in hazard Class 9, Packing Group III. **Hazard classes** (DOT PHMSA n.d.-d [49 CFR 173.2]) usually tell us what kind of risk the

SECTION 14: TRANSPORTATION INFORMATION

DOT (Ground):	UN2902, Pesticides, liquid, toxic, n.o.s. (abamectin), 6.1, PGIII
IMDG (Sea):	UN2902, Pesticides, liquid, toxic, n.o.s. (abamectin), 6.1, PGIII
IATA (Air):	UN2902, Pesticides, liquid, toxic, n.o.s. (abamectin), 6.1, PGIII

Figure 4. Section 14 of the SDS for Quali-Pro Abamectin 0.15 EC, EPA Reg. No. 53883-371. '6.1' indicates the chemical Division, a subcategory of chemical Class. 'PGIII' indicates Packing Group III. Source: Control Solutions Inc. (2020)

Table 1. How to understand packing groups by degree of risk

Packing Group	Degree of Danger
I	Great
II	Medium
III	Minor

Adapted from 49 CFR 171.8 (DOT PHMSA n.d.-e)

material presents during transport, such as being flammable, toxic, or harmful to the environment. Many pesticides are class 9, which includes environmentally hazardous substances. Of the three packing groups (Table 1), Group I represents the greatest danger and Group III represents the least danger (DOT PHMSA n.d.-e [49 CFR 171.8]). The concept is similar to signal words on pesticide labels.

Typically, landscape professionals will try to fall within the Materials of Trade (MOT) exemption under the DOT-regulated laws. This exemption allows limited quantities of certain hazardous materials to be transported without full hazardous materials shipping requirements (DOT PHMSA n.d.-b [49 CFR 173.6]; DOT FMCSA n.d.). If the MOT exemption is not met, the pesticide must be transported in full compliance with DOT hazardous materials regulations (DOT PHMSA n.d.-f [49 CFR Part 172]).

In general, to qualify for the exemption, the material must be transported for the pesticide applicator's business as an applicator, not for sale or distribution of the transported product. Among other requirements, quantity limits must be met, with individual containers limited to 66 pounds (30 kg) or 8 gallons (30 liters), and the total aggregate weight of hazardous materials in the vehicle may not exceed 440 pounds (for example, a diluted pesticide mixture in a spray tank). Containers must be leak-tight and properly secured during transport in containers that meet or exceed the manufacturers' container specifications; because some pesticide labels do not allow the pesticide to be used with secondary containers, make sure to read the pesticide label thoroughly before decanting. Containers need to be tightly secured so no movement is possible while in the bed of the pickup truck. The driver must be informed of what is being transported and what to do in case of any accidents. The MOT exception reduces paperwork and placarding requirements, but it does not eliminate responsibility. People transporting the pesticide remain accountable for safe handling, proper securement, and spill response if an incident occurs (DOT PHMSA n.d.-b [49 CFR 173.6]). The Full MOT exemption text can be seen at **https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-C/part-173/subpart-A/section-173.6**.

Even when a product is not regulated under DOT hazardous materials laws, which will be clearly indicated in the SDS Section 14, pesticide applicators are still responsible for transporting them safely. Best practices are important for reducing risk. Containers should be kept upright, secured to prevent shifting during travel, protected from puncture or damage, and separated from food or personal items, as per the pesticide labeling. Pesticide containers should be strapped to the front of the pickup truck bed, and if snug fitting secondary containment is available, it is advised to use it. Check the SDS for "physical state" to understand whether the material is a solid, liquid, or gas, which will impact what you should include in your spill kit. Also check any incompatible materials (Figure 5).

What to Do When a Spill Occurs

Every applicator should have a spill kit that differs depending on the material being transported. Your spill

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Straw-amber liquid	**Upper/Lower Flammability Limits:**	Not determined
Odor:	None	**Vapor Pressure:**	Not determined
Odor Threshold:	Not determined	**Vapor Density:**	Not determined
pH:	5.1	**Relative Density (@24°C):**	0.98 (typical)
Melting /Freezing Point:	Not determined	**Solubility:**	Miscible in water
Boiling Point/Range:	Not determined	**Partition Coefficient:**	Not determined
Flash Point:	>230°F (>110°C)	**Auto-ignition Temperature:**	Not determined
Evaporation Rate:	Not determined	**Decomposition Temperature:**	Not determined
Flammability:	Not applicable	**Viscosity:**	Not determined

SECTION 10: STABILITY AND REACTIVITY

Reactivity:	No hazardous chemical reactions known.
Chemical Stability:	Stable under normal storage and handling conditions.
Possibility of Hazardous Reactions:	No potential for hazardous reactions known.
Conditions to Avoid:	None known
Incompatible Materials:	Strong acids, strong bases and oxidizing materials.
Hazardous Decomposition Products:	Thermal decomposition may produce hazardous carbon and nitrogen oxides and hazardous organic compounds.

Figure 5. Sections 9 and 10 of the SDS for Quali-Pro Abamectin 0.15 EC Miticide/Insecticide, EPA Reg. No. 53883-371. These sections show physical state and any reactive or incompatible materials. Source: Control Solutions Inc. (2020)

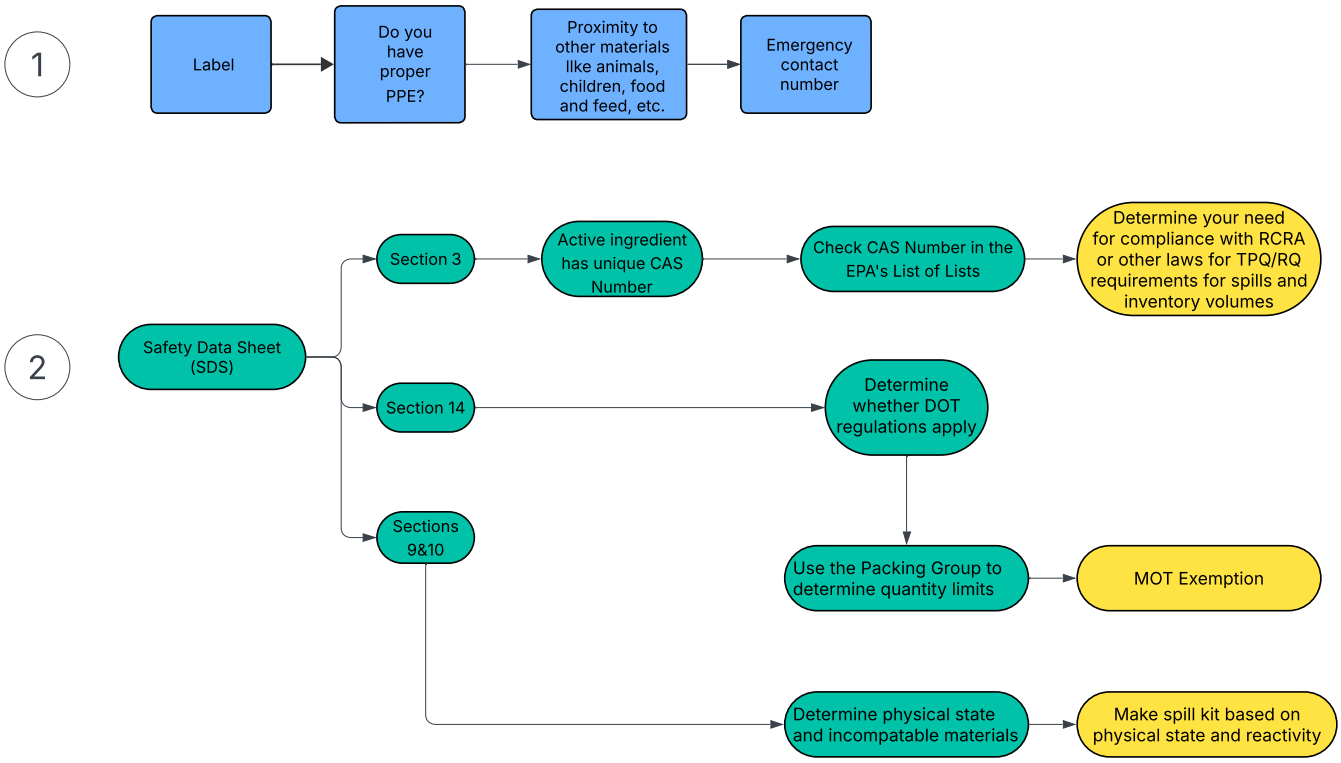

Figure 6. Flowchart depicting the thought process for working though what information you need from the label (path 1) and Safety Data Sheet (path 2) when determining how to transport a pesticide safely and compliantly. Image: Mark Dragich, Nina Pejovic, and Sarah Benimana

kit may include absorbent materials for liquid spills, a tarp or heavy powders to keep powders or dust spills in place, chemically resistant gloves, a shovel, detergent, paper towels, trash bags, and emergency contact information such as the CHEMTREC hotline, (800) 424-9300, in case of an emergency. In the cab the transporter should have their PPE (as per label instructions) along with emergency contact numbers. The label and SDS are important components of emergency response (Extension Pesticide Program n.d.) and are what first responders need immediately in case of an emergency. Make sure a copy of the label and SDS are in locations where a spill will not contaminate them.

When a spill occurs, remember, the first step is to protect yourself, then protect others and call the emergency services. Next, contain the spill and clean it up, followed by reporting if necessary.

Summary

EPA-, DOT-, and OSHA-regulated laws in the Code of Federal Regulations (CFR) 29, 40, and 49 apply when transporting hazardous materials and pesticides, so be sure you understand your products well before purchasing and transporting them (Figure 6). Even when lightly regulated, there are still best practices that will protect you, others, and the environment from harm so follow them judiciously.

Acknowledgements

The authors wish to acknowledge Eugene Kawahata of the U.S. Department of Transportation for his contributions to this publication and for reviewing. Thanks also to reviewers Adam Yamamoto and Maxwell Bendes of the Hawai'i Department of Agriculture and Biosecurity, Pesticides Branch. The authors also recognize POW 22-080 and POW 22-081.

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