

Chapter 52: [Hazardous Materials and Waste Transportation](#)

On-site Transportation Requirements

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URL: <https://www-group.slac.stanford.edu/esh/eshmanual/references/hazmattransportReqOnsite.pdf>

1 Purpose

The purpose of these requirements is to ensure the safe on-site transportation of *hazardous materials* and *hazardous waste* in compliance with the Department of Energy Order 460.1D, “Packing and Transportation Safety” ([DOE O 460.1D](#)). This order mandates that on-site transfers of hazardous materials be performed in accordance with either Title 49, *Code of Federal Regulations*, “Transportation”, Parts 171, “General Information, Regulations, and Definitions”, through 180, “Continuing Qualification and Maintenance of Packagings” ([49 CFR 171-180](#)) (DOT requirements) or a site-specific transportation safety document (TSD) that describes the methodology for achieving equivalent safety.

These requirements cover any *on-site* transportation of hazardous materials, substances, or wastes, in addition to those materials that if transported *in commerce* or on a public road would be subject to the DOT requirements. For the purposes of this document, *on-site* refers to all property within the contiguous fenced area accessed through the Sand Hill Road and the Alpine Road gates. SLAC’s property is completely within DOE-leased, Stanford-owned private property and does not have any public roads.

These requirements apply to all workers engaged in on-site transportation.

2 Requirements

2.1 General

All transport, whether by hand or by vehicle, from one room to the next, between floors of one building, or between buildings, must be performed in a manner that minimizes risk to the health and safety of employees, the public, and the environment. The requirements below are the minimum necessary to ensure this but do not restrict the implementation of safer practices or additional controls when necessary.

SLAC prohibits the transport of hazardous materials in personal vehicles, except for chemicals in consumer packaging and quantities or those addressed in [Hazardous Materials and Waste Transportation: Non-commercial Hazardous Materials Transport Procedure](#):

- Properly identified, marked, and labeled
- Segregated according to compatibility
- Secured to prevent sliding or shifting during transport

When packaging materials are used for hazardous materials transport on roads within SLAC contiguous property, they must be equivalent to the general packaging requirements of DOT hazardous materials

regulations for material compatibility and safety. Packages must also be marked with the name of the material¹ and secured from movement or shifting.

Workers are directed to use only equipment they are authorized and trained to use and only as intended. In addition to these requirements, workers are encouraged to contact their Environment, Safety, and Health (ESH) coordinators.

Table 1 General Controls for Transporting Hazardous Materials and Waste

Person	Requirement
On-site transporter	<ol style="list-style-type: none"> 1. Must be familiar with these requirements and safe transport practices 2. Must have proper equipment and training to facilitate safe transport 3. Must be familiar with emergency response procedures in the event of a spill or release

2.2 Hazardous Materials and Research Samples

Whenever possible, materials should be kept in their original containers with labels intact. If material has been transferred to a secondary container it must be labeled with a secondary label. If the material is a synthesized material or sample it needs to be labeled with a chemical name (not a symbol) and hazard. No matter the type of material or container, there needs to be enough information available to link the material to its *safety data sheet* ([SDS](#)) (if a product) and identify the appropriate [Emergency Response Guidebook \(ERG\)](#) guide in the event of a spill or release. The following requirements must be considered when planning to transport hazardous materials and research samples.

Table 2 Controls for Transporting Hazardous Materials and Research Samples

Person	Requirement
On-site transporter	<p>PPE and Security</p> <ul style="list-style-type: none"> ▪ Wears appropriate PPE for the hazard (see the SDS) ▪ Maintains possession and control of material at all times ▪ To the degree possible, transports the material directly to its final destination with no intermediate stops <p>Containers</p> <ul style="list-style-type: none"> ▪ Confirms the integrity of the primary container (for example, it is securely closed and in good condition) ▪ If the material has been repackaged using a secondary container confirms it is compatible with the material it is intended to contain (see the SDS) (for example, uses approved metal containers for solvents and plastic containers for acids and bases); avoids using glass if possible

¹ There must be enough information on the package to allow the use of the Department of Transportation [Emergency Response Guidebook \(ERG\)](#). This includes the generic chemical name of the material, the UN/NA number or, if neither of those is adequate, the appropriate three-digit guide number from the ERG must be written on the package.

Person	Requirement
	<ul style="list-style-type: none"> ▪ Uses a DOT- or OSHA-approved safety can for rated volume of five gallons or less to transport gasoline to field locations. Keeps it in the open bed of a truck. Does not transport in the trunk or compartment of a passenger vehicle. <p>Drums</p> <ul style="list-style-type: none"> ▪ Uses drums that are in good condition and free of major rust and dents ▪ Ensures that drums are not leaking or overfilled, or exceed weight capacity before transporting them ▪ Ensures that drum bungs or rings are tight ▪ Uses a drum dolly to place large or heavy drums on pallets ▪ Secures all drums to the pallet with appropriate strapping material <p>Pallets</p> <ul style="list-style-type: none"> ▪ Carefully inspects pallets before they are loaded ▪ Does not use pallets with cracked or broken slats ▪ Does not exceed rated capacity <p>Equipment</p> <ul style="list-style-type: none"> ▪ When the material is within equipment that must be moved, drains it before transporting; otherwise provides containment and spill clean-up material <p>Labels</p> <ul style="list-style-type: none"> ▪ Confirms that the container labels are intact and the information is accurate ▪ If a hazardous material has been repackaged, ensures the new container is labeled with the required information (see above) <p>Packaging and Compatibility</p> <ul style="list-style-type: none"> ▪ When packaging small containers of hazardous materials for transport, uses carrying cases, racks, or trays to keep the containers upright and to minimize shifting during transport, or uses original DOT-approved containers that they came in ▪ Does not place incompatible materials in the same tray or carrying case ▪ Protects and cushions glass containers to minimize the risk of breakage ▪ Transports only compatible materials within the same outer packaging; incompatible materials need to be segregated in a manner that precludes mixing if there is a spill or release ▪ Ensures that any cushioning or absorbent material used for packaging is also compatible with the hazardous material <p>Loading</p> <ul style="list-style-type: none"> ▪ Secures containers to prevent sliding or shifting of contents or the packages during transport; uses means such as bins, boxes, cinch straps, bungee cords to keep containers upright ▪ Inspect equipment and strapping material to ensure its integrity and that rated capacity is not exceeded ▪ If the containers shift during transport, stops immediately and re-secures the containers <p>Routes</p> <ul style="list-style-type: none"> ▪ Evaluates the route and prepares for the worse-case scenario (this is especially important if transporting highly toxic materials or large quantities of liquids). Are there storm drains, traffic, pedestrian traffic, or areas under construction? In some cases it

Person	Requirement
	<p>may be appropriate to contact SLAC Site Security to help control traffic while transporting high risk materials.</p> <ul style="list-style-type: none"> ▪ Informs receiving party that material will be moved and to prepare for receipt and storage <p><i>Note: the receiving party may need to update its area inventory; even one industrial-sized cylinder may trigger inventory requirements in an area that otherwise would not fall under this requirement.</i></p> <p>Modes of Transport</p> <ul style="list-style-type: none"> ▪ Never uses mopeds or bicycles to transport hazardous materials ▪ Employees and users must only use SLAC-owned or GSA vehicles; subcontractors must follow their own company policy and the terms of their contract with SLAC ▪ Never drives faster than is safe for the driving conditions and load being handled and uses caution when rounding corners and driving over speed bumps and is especially cautious when crossing busy intersections ▪ When transporting chemicals by foot: <ul style="list-style-type: none"> ▪ All flammable and hazardous liquids (at normal temperature and pressure) and all powdered or granular hazardous solids in glass containers should be transferred through corridors and between buildings, using chemical carriers or secondary containers. ▪ Bottle carriers should be used for flammable liquids and corrosive chemicals in glass bottles of two liters or more capacity, or plastic bags for smaller quantities. ▪ Great care should be exercised even when transporting containers within workspaces.

2.3 Compressed Gas Cylinders, Propane, and Dewars

Note Requirements addressing the design, operation, maintenance, and decommissioning of all pressure systems and their components are in [Chapter 14, “Pressure Systems”](#).

Table 3 Controls for Transporting Gas Cylinders, Propane, and Dewars

Person	Requirement
On-site transporter	<p>The following apply in addition to all of the requirements in Table 2:</p> <p>Compressed Gas Cylinders</p> <ul style="list-style-type: none"> ▪ Before loading, removes the regulator, closes valves, and installs a suitable protective valve cover (exception is if cylinder is firmly secured on a special carrier intended for this purpose) ▪ Does not use ropes, chains, or slings to lift or suspend cylinders unless provisions have been made on the cylinder for appropriate lifting attachments such as lugs. For cylinders not designed for lifting attachments, suitable cradles, sling boards, platforms, or pallets may be used. Attachments must never be welded to a cylinder. Cylinders must not be hoisted or transported by means of magnets or choker slings. ▪ Lifts cylinders by the body (not the valve cover) in order to avoid dropping the cylinder

Person	Requirement
	<ul style="list-style-type: none"> ▪ Never drags, slides, or rolls a cylinder; rolls large cylinders by tilting and rolling on their bottom edges ▪ Transports large cylinders, secured in a vertical position, using a suitable hand truck, forklift, or cylinder pallet system ▪ Properly secures cylinders and dewars to the vehicle by such means as appropriate cylinder cart basket or straps ▪ Transports cylinders in an open truck or the cargo area of a closed bodied vehicle; does not transport in the passenger area of a vehicle ▪ Removes cylinders from closed-bodied vehicles as soon as possible to minimize the possibility of relief valve discharge, especially in warm weather <p>Dewars</p> <p>In addition to the above</p> <ul style="list-style-type: none"> ▪ Use handcarts to move cryogenic liquid containers (dewars) to and from the vehicle. Dewars cannot be rolled on their edge like cylinders, and must be moved by use of a four-wheeled hand truck designed for containers with a capacity greater than 20 gallons (76 liters). Hand trucks must be kept in good condition to avoid tipping or losing control of heavy dewars and possibly leading to injury and severe freezing of tissue. ▪ Dewars must be allowed to vent.

2.4 Radioactive Materials

SLAC defines radioactive materials in [Criteria Defining and Monitoring for Radioactive Material](#). The movement of all radioactive materials within SLAC requires a prior radiological survey by Radiation Protection Field Operations (RPFO) workers. All material transported must have a radioactive material label attached to the material. RPFO also provides guidance on packaging for safe transportation when necessary. Additional information on contamination controls are found in the [Radiological Control Manual](#) and [Chapter 9, “Radiological Safety”](#).

Table 4 Controls for Transporting All Radioactive Materials

Person	Requirement
On-site transporter	<p>The following apply in addition to all of the requirements in Table 2:</p> <ul style="list-style-type: none"> ▪ Is GERT-qualified and wears personal dosimeters; must be RWTII if moving contaminated material ▪ Reviews labels regarding dose rates and contamination levels to ensure they are within the limits specified in the Radiological Control Manual ▪ Ensures materials with radioactive contamination are double bagged/equivalent, and if heavy or has possible puncture points, uses a durable outer covering ▪ Ensures destination is properly identified and posted by RP (for example, a radiologically controlled or radiation area) to receive material (and may need to be indoors) ▪ Notifies the destination’s area manager or building manager if the receipt of the material may impact other work or workers in the area

2.5 Hazardous, Mixed, and Radioactive Waste

On-site transportation of DOT-regulated wastes requires the most comprehensive documentation, oversight, and control due to regulatory requirements from agencies such as the Environmental Protection Agency and Nuclear Regulatory Commission. Declaration forms are used to classify the waste, document its generation, and track its progress through disposal. Both Waste Management and Radiation Protection Radioactive Waste Management (RPRWM) provide container specifications, packaging guidelines, and segregation and load-bracing requirements as needed. All waste packages are marked and labeled as needed with SLAC internal numbers, hazardous waste labels (including constituents), other required notices (for example, asbestos), and radiation survey information.

It is strongly encouraged to limit the transport from of hazardous waste on-site to Waste Management whenever possible. The requirements for transporting hazardous waste on-site are listed below. Additional information on moving radioactive waste on-site, which includes mixed waste, is located in Chapter 4 of the [Radioactive Waste Manual](#).

Table 5 Controls for Transporting Hazardous, Mixed, and Radioactive Waste

Person	Requirement
On-site transporter	<p>The following apply in addition to all of the requirements in Table 2:</p> <p>Hazardous Waste</p> <ul style="list-style-type: none"> ▪ Obtains clearance from Field Services Department workers to move hazardous waste to a new location ▪ Makes sure containers for hazardous waste are labeled with SLAC hazardous waste labels (see Chapter 17, “Hazardous Waste”), which contain the following additional information: <ul style="list-style-type: none"> ▪ Date that the first drop of hazardous waste was placed in the container ▪ The words HAZARDOUS WASTE ▪ Name of the hazardous waste ▪ Hazard class ▪ Name and extension of the person responsible for the contents of the container <p>Mixed and Radioactive Waste</p> <ul style="list-style-type: none"> ▪ Obtains clearance from RP to move mixed or radioactive waste to a new location ▪ Be GERT-qualified and wear personal dosimeters; must be RWTII if moving contaminated material ▪ Notifies receiving facility of intended transport ▪ Reviews labels regarding dose rates and contamination levels to ensure they are within the limits specified in the Radiological Control Manual ▪ Makes sure containers or items are marked and tagged with radiological surveys, EPA, DTSC, or other required notices

3 Forms

The following forms and systems are required by these requirements:

- [Hazardous Waste Pick-Up and Empty Container Request Form](#) (SLAC-I-800-0A08R-001). Form used to request from Waste Management delivery and pickup of waste containers

4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

- There are no recordkeeping requirements for general staff and users. All records are kept by the responsible groups and program managers.

5 References

[SLAC Environment, Safety, and Health Manual](#) (SLAC-I-720-0A29Z-001)

- [Chapter 52, “Hazardous Materials and Waste Transportation”](#)
 - [Hazardous Materials and Waste Transportation: Non-commercial Hazardous Materials Transport Procedure](#) (SLAC-I-730-0A09C-006)
 - [Hazardous Materials and Waste Transportation: In Commerce Transport Procedure](#) (SLAC-I-730-0A09C-007)
- [Chapter 9, “Radiological Safety”](#)
- [Chapter 14, “Pressure Systems”](#)
- [Chapter 17, “Hazardous Waste”](#)
- [Chapter 34, “Biosafety”](#)
- [Chapter 40, “Chemical Lifecycle Management”](#)
- [Chapter 53, “Chemical Safety”](#)
- [Chapter 58, “Laboratory Safety”](#)

Other SLAC Documents

- [Chemical Management Services \(CMS\)](#)
- [Radiological Control Manual](#) (SLAC-I-720-0A05Z-001), Chapter 4, Part 2, “Release and Transportation of Radioactive Material”, and Part 3, “Radioactive Source Controls”
- [Radioactive Waste Manual](#) (SLAC-I-760-2A08Z-001), Chapter 4, “Moving Radioactive Waste On-Site”
- [Shipping and Receiving of Radioactive Materials Procedure](#) (SLAC-I-760-0A30C-002, FO 010)
- [Criteria Defining and Monitoring for Radioactive Material](#) (SLAC-I-760-2A30C-006, FO 018)
- [Nanomaterial Safety Plan](#) (SLAC-I-730-0A09M-008)

Other Documents

- Title 49, *Code of Federal Regulations*, “Transportation”, Chapter 1, “Pipeline and Hazardous Materials Safety Administration, Department of Transportation”, Subchapter C, “Hazardous Materials Regulations”, Parts 171, “General Information, Regulations, and Definitions”, through 180, “Continuing Qualification and Maintenance of Packagings” ([49 CFR 171-180](#)) (DOT requirements)
- Department of Energy Order 460.1D, “Packing and Transportation Safety” ([DOE O 460.1D](#))
- Department of Energy Handbook 1139, “Chemical Management” ([DOE-HDBK-1139](#))
- Department of Transportation. [Emergency Response Guidebook \(ERG\)](#)