Containment and Secondary Containment Requirements – Quick Tips

Introduction

The Environmental Protection Agency (EPA) addresses containment and secondary containment systems in the Resource Conservation and Recovery Act (RCRA) found in Title 40 Code of Federal Regulations (CFR) Part 264.

The EPA refers to the need for containment and secondary containment in two different areas. Subpart I, Use and Management of Containers (40 CFR 264.175), which covers portable storage containers, such as 55-gallon drums, for hazardous waste, and the second in Subpart J, Tank Systems (40 CFR 264.193), which covers large stationary containers, such as tank systems, for hazardous waste.

Hazardous Materials and Hazardous Wastes

According to the Institute of Hazardous Materials Management a hazardous material is any item or agent (biological, chemical, radiological, and/or physical), which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors.

Hazardous materials are defined and regulated in the United States primarily by laws and regulations administered by the EPA, Occupational Safety and Health Administration (OSHA), Department of Transportation (DOT), and Nuclear Regulatory Commission (NRC). Each has its own definition. OSHA defines a hazardous chemical as any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified. EPA incorporates the OSHA definition, and adds any item or chemical which can cause harm to people, plants, or animals when released by:

- Spilling,
- Leaking,
- Pumping,
- Pouring,
- Emitting,
- Emptying,
- Discharging,
- Injecting,
- Escaping,
- Leaching,
- Dumping, or

- Disposing into the environment.

EPA: Portable Containers

The EPA does not use the term “secondary containment” when addressing portable containers. Instead, they refer only to containment under 40 CFR 264.175(b). It says that a containment system must be designed and operated as follows:

1. A base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills and accumulated precipitation until the collected material is detected and removed.
2. The base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids.
3. The containment system must have sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids need not be considered in this determination.
4. Run-on into the containment system must be prevented unless the collection system has sufficient excess capacity to contain any run-on which might enter the system. Excess capacity must be in addition to the 10% of the volume of containers or the volume of the largest container, whichever is greater.
5. Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system.

Under 40 CFR 264.175(c), the EPA also addresses storage areas that store containers holding only wastes that do not contain free liquids and sets the following provisions for the storage areas:

1. The storage area must be sloped or otherwise designed and operated to drain and remove liquid resulting from precipitation, or
2. The containers must be elevated or otherwise protected from contact with accumulated liquid.

There are certain wastes for which a storage area alone will not suffice. These waste streams are listed under 40 CFR 264.175(d) and require a containment system in addition to the storage area.

EPA: Tank Systems

The EPA specifies under 40 CFR 264.193(b) that secondary containment systems are required to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water or surface water during the use of the tank system. Minimum requirements of how the system must be constructed are listed in 40 CFR 264.193(c) and include:

1. Constructed of or lined with materials that are compatible with the wastes to be placed in the tank system and must have sufficient strength and thickness to prevent failure owing to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which it is exposed, climatic conditions and the stress of daily operation (including stresses from nearby vehicular traffic).
2. Placed on a foundation or base capable of providing support to the secondary containment system, resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression or uplift.

3. Provided with a leak-detection system that is designed and operated so that it will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the owner or operator can demonstrate that existing detection technologies or site conditions will not allow detection of a release within 24 hours.
4. Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as possible to prevent harm to human health and the environment if the owner or operator can demonstrate that removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.

Along with the above requirements, a provision has been made that requires that one or more of the following devices also be implemented:

1. A liner (external to the tank)
2. A vault
3. A double-walled tank; or
4. An equivalent approved device

These four devices need to meet the stringent specifications spelled out in 40 CFR 264.193(e). For example, an external liner must be:

1. Designed or operated to contain 100% of the capacity of the largest tank within its boundary;
2. Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event.
3. Free of cracks or gaps; and
4. Designed and installed to surround the tank completely and to cover all surroundings likely to come into contact with the waste if the waste is released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

Uniform Fire Code and International Fire Code

Facilities that store hazardous materials may also be required to meet either the Uniform Fire Code (UFC) or International Fire Code (IFC). If you have questions regarding compliance with either the UFC or IFC standards, consult with your Authority Having Jurisdiction (AHJ) – normally your local fire marshal. When referring to the UFC you need to clarify with the AHJ, which fire code release needs to be applied to achieve compliance. Some states and municipalities have adopted the UFC from the National Fire Protection Association (NFPA), also known as NFPA 1. Others have adopted the UFC released by the International Conference of Building Officials (ICBO). Since the creation of the International Code Council (ICC) in 1994, the UFC is no longer maintained (last release in 1997). It has been superseded by the subsequent releases of the IFC published by ICC. In the past several attempts to merge these two widely used model codes were unsuccessful.

Choosing a Containment System

When selecting a containment system for an application, many issues need to be considered. A list of issues and some things to contemplate are listed below.

1. Is the system chemically compatible with the products being stored?
    - . Containment system sumps are primarily constructed of one or two materials: high-density polyethylene or steel.

1. Skids usually have material choices for grids or platforms. The choice of material depends on chemical resistance as well as disposability of the product. Examples include:
    - . Wood platforms: Once contaminated, they are disposed of according to local regulations.

1. Fiberglass grids: Compatible with a wide variety of chemicals, but not suitable for corrosive materials.
2. Polyethylene grids: Compatible with a wide variety of chemicals including many corrosive materials.

2. How will the system be monitored and cleaned?
    - . Most units have drains. If they don’t, usually a spill cleanup kit will be adequate to clean up the internal sump area of the system.
3. What volume and weight of the containers will be stored?
    - . According to federal codes, a containment system must have a sufficient capacity to contain 10% of the volume of the containers or the volume of the largest container, whichever is greater. Some states may have more stringent restrictions and you should contact your AHJ for your local requirement.

1. Containment systems are commonly rated with a static weight capacity. This is a weight in a stationary mode.

4. How often will the containment system be moved? How will it be moved?
    - . Portable containment units are intended to be moved without containers on them. This is the safest mode of transport. The containers can be replaced once the containment system has reached its destination.

1. Most portable containment systems are constructed with fork pockets. These are designed to accept and be moved by forklifts or pallet jacks.

5. How will the containers be loaded onto the system?
    - . Ramps that accommodate containment systems are the easiest way to load a system. Low-profile containment systems have also been developed to address the loading issues.
6. How many containers will be loaded on the system?
    - . Portable containment systems range from accommodating four 5-gallon pails to one 55-gallon drum to whole-room containment systems for drums. Make sure when dealing with flammable products and the larger containment systems that your local fire codes are met. There are restrictions for quantities of flammable products that can be stored in one area depending on the class of the flammable product.
7. Are any of the products being stored considered flammable?
    - . Special provisions need to be taken into account, such as grounding and bonding and the amount of flammable product being stored in one area. Check your local codes for these specifications.
8. What are the state and local codes for secondary containment in your area?
    - . A listing of the regional EPA offices can be found on EPA website. Phone numbers of divisions that deal with secondary containment are listed. The regional office can refer to state EPA agencies that can explain state codes. Another source for secondary containment requirements is your AHJ.

Frequently Asked Questions

Q: What are free liquids?

A: Free liquids are liquids that readily separate from the solid portion of a waste under ambient temperature and pressure.

Q: What does "10% of the volume of the containers, or the volume of the largest container, whichever is greater" mean?

A: As an example, consider storing four 55-gallon drums:

- Four drums x 55 gallons per drum = 220 gallons
- 10% of all = 10% of 220 gallons = 22 gallons

OR

- Volume of the largest container = 55 gallons

In this case, you would need 55 gallons of containment capacity.

Sources

Environmental Protection Agency Use and Management of Containers
Environmental Protection Agency Tank Systems
Institute of Hazardous Materials Management
Occupational Safety and Health Administration Hazard Communication Standard