

Hazardous Waste Tanks

Guidance on Hazardous Waste Requirements



Introduction

Tank systems are widely used for storage, accumulation and treatment of hazardous wastes. These hazardous waste tank systems include the tank and any ancillary equipment, including piping, fittings, flanges, valves, and pumps used to distribute, meter, or control hazardous waste flow to or from the tank.

Hazardous waste regulations are found in chapters [NR 600-679](#) of the Wisconsin Administrative Code

This document provides guidance on the requirements for properly managing hazardous wastes in above-ground tank systems. These regulations apply to large quantity hazardous waste generators and licensed treatment, storage and disposal facilities.

Other state and/or federal programs may have regulations pertaining to tanks and tank systems. For example:

- Product tanks may be regulated by the DNR Air Management Program.
- The United States EPA has long-established rules on tank systems containing any type of oil (40 CFR Part 112).
- Tank systems containing combustible or flammable liquid, including gasoline, diesel, other fuels or hazardous substances are regulated by the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP) under ATCP 93, Wis. Adm. Code.
- ATCP 93 includes requirements for certifying tank assessors, inspectors and tank tightness testing, among other certifications. Individual hazardous waste tanks with a design capacity of greater than 5,000 gallons must also register with DATCP under ATCP 93. This guidance does **not** provide in-depth information on underground tank systems, vault systems or cathodic protection systems, as these types of systems are infrequently used. For more information about these systems, go to dnr.wi.gov and search “waste.”

Terms and Definitions

Ancillary Equipment: Ancillary equipment includes any devices, such as piping, fittings, flanges, valves, and pumps that are used to distribute, meter, or control the flow of hazardous waste from the point of generation to a tank, transfer between tanks, or to a point of disposal onsite or shipment offsite. [NR 660.10(4), Wis. Adm. Code]

Containment System: Examples of secondary containment systems include liners, vaults and double walled tanks. These systems must prevent any migration of wastes or accumulated liquid from the tank system to the soil, groundwater, or surface water and must be capable of detecting and collecting releases and accumulated liquids. [NR 665.0193, Wis. Adm. Code]

Existing tank system or existing component means a tank system or component that is used for the storage or treatment of hazardous waste that is in operation, or for which installation commenced on or prior to **March 1, 1991**. [NR 660.10(39), Wis. Adm. Code]

Hazardous Waste Tanks: Any device that would meet all the following criteria:

[NR 660.10(116), Wis. Adm. Code]

- Stationary device
- Made primarily of non-earthen materials that provide structural support
- Used/designed to contain an accumulation of hazardous waste

While a “frac” tank may be on wheels it is not moveable when full of liquid, at which point it is considered a tank system. Similarly, some “totes” which are plumbed in place are regulated tank systems.

New tank system or new tank component means a tank system or component that will be used for the storage or treatment of hazardous waste and for which installation has commenced after March 1, 1991, except, however, for purposes of ss. NR 664.0193 (7) (b) and 665.0193 (7) (b), a new tank system is one for which construction commences after July 14, 1986. **Most hazardous waste tanks in Wisconsin are subject to new tank system requirements because the definition includes reinstalled and replacement tank systems or components.** [s. NR 660.10(83), Wis. Adm. Code]

Tank System: a hazardous waste accumulation, storage or treatment tank and its associated ancillary equipment and containment system. [s. NR 660(117), Wis. Adm. Code]

“Existing” Tank Systems

A category of tanks that were called “existing tanks” was created when the federal rules on hazardous waste tanks were adopted by the State of Wisconsin in July 2006. The “existing” tank systems were defined as in-place prior to 1991, and the intention was that these older tank systems would eventually need to comply with the “new tank” standards and performance requirements as they underwent significant repairs or alterations.

The DNR presumes that all tank systems in operation today are subject to “new tank system” standards. This is because since 1991, most older tank systems:

- have undergone significant repairs or alterations during which the tank systems have been taken out of service;
- have had significant repairs due to leaks or damage; or
- have changed the type of material in service, such as a different type of hazardous waste being placed in the tank system (for example from an ignitable waste to a corrosive waste).

Sources may be able to prove that “existing tank system” requirements apply, however, through appropriate recordkeeping. The remainder of this document addresses requirements applicable to “new tank systems.”

Design and Installation of Tank Systems

The following sections provide general information on design and installation taken from the applicable administrative code. It is recommended that facilities review s. NR 664.0192, Wis. Adm. Code, for a more comprehensive set of new tank system and component installation and design requirements.

Tank Design Assessment

For licensed treatment, storage and disposal (TSD) facilities submitting a feasibility and plan of operation report, tank system owners or operators must include a written tank assessment that has been reviewed and certified by a **qualified professional engineer**. The assessment must attest that the foundation, structural support, seams, connections and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength, compatibility with the wastes to be stored or treated and corrosion protection to ensure that it will not collapse, rupture or fail. For non-licensed tank systems, a tank design assessment must also be prepared and be kept in the operating record (see the Recordkeeping section for more information).

Tank Installation and Handling Procedures

The owner or operator of a new tank system must ensure proper handling procedures to prevent damage during installation. Prior to covering, enclosing or placing a new tank system or component in use, an **independent, qualified installation inspector** or a **qualified professional engineer** must inspect the system for structural damage or inadequate construction or installation. All discrepancies must be remedied before the tank system is covered, enclosed or placed in use.

Post-Installation Tightness Testing

All new tanks and ancillary equipment must be tested for tightness prior to being covered, enclosed or placed in use. If a tank system is found not to be tight, all repairs necessary to remedy the leaks in the system must be performed prior to the tank system being covered, enclosed or placed into use. Note that tightness testing performed at a tank manufacturer for QA/QC purposes does not suffice for after-installation tightness testing of tank systems, including ancillary equipment.

Design and Installation of Ancillary Equipment

Ancillary equipment must be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion or contraction.

Corrosion Protection

The owner or operator must identify the type and degree of corrosion protection recommended by an independent corrosion expert and document and retain the assessment. An independent corrosion expert must supervise the installation of a corrosion protection system that is field fabricated, to ensure proper installation.

Recordkeeping

The owner or operator must keep written statements by those persons required to certify the design and installation of the tank system at the facility. These written statements must include the certification statement required in s. NR 670.011(4)(a), Wis. Adm. Code. (See Recordkeeping section below for more information.)

Secondary Containment Systems

Secondary containment is required to prevent the release of hazardous waste or hazardous constituents to the environment, and must meet the following requirements:

1. Designed, installed and operated to prevent liquid and/or waste releases.
2. Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

Secondary containment systems must be constructed with materials compatible with the wastes they will hold and be sufficiently strong to prevent failure due to pressure gradients, physical contact with waste, climatic conditions and the stress of daily operations. Further, the secondary containment must be

placed on a foundation capable of providing support and preventing failure due to settlement, compression or uplift.

Secondary containment can include one or more of the following: an external liner, vault, double-walled tank, or an equivalent device approved by the DNR. Design standards for each type of equipment are found in ss. NR 664.0193 (5) and NR 665.0193 (5), Wis. Adm. Code.

Leak Detection

- A robust leak-detection system designed to detect failure of the primary or secondary structure, or the presence of hazardous waste or accumulated liquid, must be part of the containment system. The system must include the following features: Leaks must be detected within 24 hours of occurrence, or at the earliest practical time.
- Once detected, liquids (from leaks, spills or precipitation) must be removed within 24 hours or in as timely a manner as possible to prevent harm to human health and the environment.
- Release detection can include electronic sensors.
- Daily visual inspections of above-ground systems are permissible provided that the above ground system is accessible for inspections and that visual inspection would reliably show a leakage.

Generally, tank systems which allow for full visual inspection of the base of the tank are more easily inspected for leaks (for example, a cone-bottom tank). Other tank systems may require special designs that allow for visual inspections of the tank system, for both leaks and tank pedestal integrity.

Ancillary Equipment

Ancillary equipment must also have a secondary containment system, such as a trench, jacketing, or double-walled piping that meets the above requirements.

The following types of ancillary equipment do **NOT** require secondary containment **provided they are visually inspected daily for leaks**:

- aboveground piping (except for flanges, joints, valves and other connections),
- welded flanges, and
- sealless or magnetic coupling pumps and sealless valves and/or pressurized aboveground piping systems with automatic shut-off devices.

Review ss. NR 664.0193 and NR 665.0193, Wis. Adm. Code, for more complete information on secondary containment systems.

Additionally, secondary containment and release detection are **NOT** required for the following:

- Tank systems containing no free liquids and located inside a building with an impermeable floor.
- Tank systems, including sumps, that serve as part of a secondary containment systems.

Note that Small Quantity Generators are required to have secondary containment for uncovered tanks having less than 2 feet of freeboard.

External liner systems

An external liner is designed to provide protection against lateral or vertical migration of leaking or spilled waste. These liners must completely surround the tank system with an impermeable material and require regular evaluation and maintenance. A liner can be made with many different types of materials such as synthetic membranes, coated concrete, or other compatible impermeable materials. The exact

type of material or combination of materials used depends on site conditions and waste characteristics, and should be designed and installed by qualified professionals.

The external liner system must be large enough to contain 100 percent of the capacity of the largest hazardous waste tank within its boundary. Because an external liner system can increase the rate of tank corrosion, stormwater run-on and infiltration should be minimized by using dikes and diversion ditches. If stormwater infiltration is not controlled in this manner, the system must have enough additional holding capacity to contain precipitation resulting from a 25-year, 24-hour storm event.

A commonly observed violation is when external liner systems are found cracked, flaking, peeling, or in poor condition. Concrete and any concrete seams must be sealed with chemically compatible coatings or materials (chemically compatible water stops for seams). Coatings must be maintained on a regular basis.

An owner or operator may obtain a variance from the requirements of this section under the terms of ss. NR 664.0193(7) or NR 665.0193(7), Wis. Adm. Code.

General operating requirements

The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or containment systems. These include at a minimum:

- Spill prevention controls (e.g., check valves, dry disconnect couplings).
- Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff or bypass to a standby tank).
- Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

Additionally:

- If a leak or spill occurs in the tank system, the owner or operator must comply with the requirements of ss. NR 664.0196 or NR 665.0196, Wis. Adm. Code.
- Hazardous wastes or treatment reagents may not be placed in a tank system if they could cause the tank, its ancillary equipment or the containment system to rupture, leak, corrode or otherwise fail. [ss. NR 664.0194 and NR 665.0194, Wis. Adm. Code]
- The owner or operator is required to develop and follow a schedule and procedure for inspecting tank overfill controls. [ss. NR 664.0195 and NR 665.0195, Wis. Adm. Code]

Inspections

An operating day is defined as any day, including during a weekend or holiday when a facility is closed, when there is stored/accumulated material in the tank system. The definition of operating day is based on the US EPA's most recent interpretation. In lieu of daily tank system inspections, weekly tank system inspections of the areas noted above may be allowed provided the owners or operators of the tank system use leak detection systems (such as electronic sensors) to alert facility personnel or implement established workplace practices to ensure leaks are promptly identified. These automated leak detection methodologies and procedures and/or workplace practices to ensure leaks are promptly identified must be documented and kept with the facility's operating record (see Recordkeeping section below).

The following must be inspected or reviewed at least once each operating day:

- Data gathered from tank monitoring and leak detection equipment.
- Above-ground portions of the tank system to detect corrosion or releases of waste.
- The constructed components of the tank system and area immediately surrounding the tank system, including the secondary system, to detect corrosion or signs of hazardous waste releases.
- Ancillary equipment without a secondary containment system.

An inspection log of the above items must be kept with the facility's operating record.

Periodic Tank Assessments and Recertifications

Although not specifically required by code, it is critical that all tank systems be periodically evaluated or assessed by qualified persons to ensure they are fit for continued service. The type and frequency for these assessments should be based on recommendations from the manufacturer or trade group such as Steel Tank Institute (STI) or American Petroleum Institute (API). Assessments must include both internal and external evaluations and will depend on the tank system's age, material of construction, type of materials contained, and tank system design capacity. DATCP has a fact sheet on STI SP001, an industry accepted inspection standard, which includes monthly, annual, and 20-year inspections for shop-built metallic aboveground fixed storage tanks.

There are situations where a tank system may require an assessment and a recertification by a qualified professional engineer in accordance with s. NR 670.011 (4), Wis. Adm. Code, before the return of a tank system to service. The recertification must state that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. These situations may include any of the following:

- Any rupture or leak of the tank system (primary containment) or tank secondary containment system;
- A repair or modification requiring the tank to be taken out of service;
- A repair or modification requiring the tank to be moved or lifted; or
- A non-routine repair of a secondary containment external liner system.

Similar to the design and installation certification requirements, a recertification written statement must be placed in the operating record and maintained until closure of the facility. These written statements must include the certification statement required in ss. NR 670.011(4)(a), Wis. Adm. Code. (see Recordkeeping section below)

For more general information on tank assessment and certification see the Washington State Department of Ecology publication 94-114, *Guidance for Assessing and Certifying Tank Systems*.

Ignitable, Reactive or Incompatible Wastes

Ignitable or Reactive Wastes may **not** be placed in tank systems, unless one of the following applies: [ss. NR 664.0198 and NR 665.0198, Wis. Adm. Code]

- (a) The waste is treated, rendered or mixed before or immediately after placement in the tank system so that all of the following apply:

1. The resulting waste, mixture or dissolved material no longer meets the definition of ignitable or reactive waste under ss. NR 661.21 or NR 661.23, Wis. Adm. Code.
 2. Sections NR 664.0017 (2) or NR 665.0017 (2), Wis. Adm. Code, are complied with.
- (b) The waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to ignite or react.
- (c) The tank system is used solely for emergencies.

The owner or operator of a facility where ignitable or reactive waste is stored or treated in a tank must comply with the requirements for the maintenance of protective distances between the waste management area and any public ways, streets, alleys or an adjoining property lines.

All above-ground tank systems accumulating or storing ignitable and/or combustible hazardous wastes in tanks greater than or equal to 110 gallons must follow ch. ATCP 93, Wis. Adm. Code standards in addition to requirements outlined in Subchapter J of chs. NR 664 and 665, Wis. Adm. Code. If tank systems accumulate or store ignitable or combustible materials and have a design capacity greater or equal to 5,000 gallons, these tanks must also be registered under ATCP 93.

Incompatible Wastes may **not** be placed in the same tank system. Further, hazardous waste may **not** be placed in a tank system that previously held an incompatible waste or material and has not been decontaminated, unless in compliance with ss. NR 664.0017 or NR 665.0017, Wis. Adm. Code.
[ss. NR 664.0199 and NR 665.0199, and ch. NR 664 Appendix V, Wis. Adm. Code]

Air Emission Standards

The owner or operator must manage all hazardous waste placed in tank systems in accordance with the applicable requirements of subchapters AA, BB, and CC in chs. NR 664 and 665, Wis. Adm. Code.

Where there is ancillary equipment and hazardous wastes containing organic material (for example, used solvents), **it is very likely that both subchapters CC and BB requirements will apply.**

- Subchapter CC deals with minimizing fugitive volatile organic compound (VOC) emissions from hazardous waste containers and tank systems.
- Subchapter BB deals with fugitive VOC leaks from equipment associated with tank systems – pumps, valves, connectors, pressure-relief devices, sampling points and open-ended lines. See the Resources section below for information from US EPA on RCRA air emissions standards and the Addendum for required records.

Recordkeeping

TSDF/LQG Hazardous Waste Tank Records

During a typical site inspection, the following records are requested for each hazardous waste tank system at the facility. The requested records will be used to demonstrate compliance with Subchapter J – Tank Systems and Subchapter CC - Air Emission Standards for Tanks, Surface Impoundments and Containers of s. NR 664/665 Wis. Adm. Code. This section may not represent all of the documents that may be needed during the inspection. Documentation must be maintained for a minimum of three years. Contact the appropriate regional hazardous waste compliance specialist with questions.

Tank Systems

Written tank assessment certified by a qualified professional engineer. The content requirements of the assessments can be found in s. NR 665.0192(1), Wis. Adm. Code.

1. Written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system. The content requirements of the assessments can be found in s. NR 665.0192(7), Wis. Adm. Code.
2. Documentation indicating that tanks are outfitted with overflow prevention controls such as level sensing devices, high levels alarms, or automatic feed cutoff systems.
3. Documentation of any spill prevention controls such as check valves or dry disconnect couplings used.
4. Daily record of data gathered from monitoring and leak detection equipment (for example, pressure of temperature gauges, monitoring wells) to ensure that the tank system is being operated according to its design.
5. Daily inspection log for each hazardous waste tank for each day the tank is in use. The content requirements of the assessments can be found in s. NR 665.0195(1), Wis. Adm. Code. Records must indicate that the hazardous waste tank system is visually inspected for leaks every day that the tank(s) contain hazardous waste unless the requirements for the alternative inspection schedule found in s. NR 665.0195(3), Wis. Adm. Code, are followed. If an alternate inspection schedule is used, it must be documented in the facility's operating record.
6. Records of all spills and leaks in the secondary containment system or tank over the past three years.

Secondary Containment

External Liner Systems:

- Documentation to demonstrate that any external liner system is designed or operated to contain 100% of the capacity of the largest tank.
- Documentation to demonstrate that any external liner system is designed and operated to prevent run-on or infiltration of precipitation unless the collection system has capacity to contain all precipitation from a 25-year, 24-hour rainfall event.

Vault system:

- Documentation to demonstrate that the vault system is designed and operated to contain 100% of the capacity of the largest tank.
- Documentation to demonstrate that the vault system is designed and operated to prevent run-on or infiltration of precipitation unless the collection system has capacity to contain all precipitation from a 25-year, 24-hour rainfall event.

Double-walled tank:

- Documentation to demonstrate that the double-walled tank was designed as an integral structure so that the outer shell contains any release from the inner tank.

Air Emission Standards (Subchapter CC of chs. NR 664 and 665, Wis. Adm. Code)

1. For each tank holding hazardous waste containing greater than or equal to 500 ppm VOC, the facility must maintain documentation showing the maximum organic vapor pressure of the contents.
2. Documentation that tank systems with fixed roofs or closure devices were visually inspected on an annual basis.
3. Documentation of, and justification for, each tank being excluded from Subchapter CC requirements.

4. Documentation of, and justification for, any fixed roof or closure device that has been designated as "unsafe to inspect and monitor."
5. If a leak is detected, records that the first efforts at repair are made within 5 calendar days of detection and completed no later than 45 calendar days after detection.
6. If ancillary equipment (pumps, valves, pressure relief devices, connectors) contain or contact hazardous waste liquids with an organic content greater than 10%, the standards and record-keeping requirements of Subchapter BB may apply.

Additional Resources

DATCP Petroleum / Hazardous Liquids Storage Tanks Overview website: https://datcp.wi.gov/Pages/Programs_Services/PetroleumHazStorageTanks.aspx
EPA RCRA Air Emissions website, <i>Reduction of Hazardous Waste Air Emissions, April 2018</i> https://www.epa.gov/hwpermitting/rcra-organic-air-emission-standards-tsdfs-and-generators
EPA RCRA Training Module <i>Introduction to Tanks, September 2005</i> : https://www.epa.gov/sites/production/files/2015-07/documents/tanks05.pdf
DATCP Inspection Requirements for Aboveground Storage Tanks https://datcp.wi.gov/Documents/STI-SP001ASTInspections.pdf
Washington State Department of Ecology publication 94-114, <i>Guidance for Assessing and Certifying Tank Systems</i> : https://apps.ecology.wa.gov/publications/publications/94114.pdf

Resources and Contact information

For more information including [publications, inspection forms, and administrative codes and statutes](#), go to dnr.wi.gov and search "hazardous waste resources." Use the *Additional Resources* menu to navigate to specific topics. For staff contact information, go to the [staff directory](#) and enter "hazardous waste requirements" in the subject field and choose the appropriate county contact.

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