

Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Quick Reference

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Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Quick Reference

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Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

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Other Rules that may apply to your workplace

- The WISHA Safety and Health Core Rules, Chapter 296-800 WAC, contain the basic requirements that apply to most employers in Washington. They also contain:
 - An Introduction that lists important information you should know, including a section on building, fire and electrical codes.
 - A Resource section that includes a complete list of all WISHA rules and a directory of the Labor and Industries (L&I) offices.
- Other WISHA rules may apply to you, depending on the activities and operations of your workplace. Contact your local L&I office if you're uncertain about which WISHA requirements apply to you.
- To go online to access all the Safety and Health Rules: <http://www.lni.wa.gov/wisha>
- If you would like to receive e-mail notification of rule updates, please register for the Standards Listserv on the WISHA web site at <http://www.lni.wa.gov/home/listservs.htm>
- For a CD or paper copy contact us by:

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Dipping and Coating Operations (Dip Tanks)

WAC 296-835-100

Scope

Scope



Important:

A *dip tank* is a container holding a liquid other than plain water that is used for dipping or coating. An object may be completely or partially immersed (in a dip tank) or it may be suspended in a vapor coming from the tank.



Exemption:

Dip tanks that use a molten material (molten metal, alloy, salt, etc.) aren't covered by this chapter.

This chapter **applies** to:

- A dip tank that uses a liquid other than plain water, or the vapor of the liquid, to:
 - Clean an object
 - Coat an object
 - Alter the surface of an object
- OR**
- Change the character of an object
- Draining or drying an object that has been dipped or coated.

-Continued-

Dipping and Coating Operations (Dip Tanks)

WAC 296-835-100

Scope

(Continued)

Examples of covered dipping and coating operations include, but aren't limited to:

- Paint dipping
- Electroplating
- Anodizing
- Pickling
- Quenching
- Tanning
- Degreasing
- Stripping
- Cleaning
- Dyeing
- Flow coating
- Roll coating



Reference:

You have to do a hazard assessment to identify hazards or potential hazards in your workplace and determine if PPE is necessary to protect your employees. See Personal Protective Equipment (PPE), WAC 296-800-160, in the Safety and Health Core Rules, chapter 296-800 WAC.



Helpful Tool:

You have to select appropriate Personal Protective Equipment (PPE) if it's necessary to protect employees from the hazards of dip tank operations. PPE consideration for some of the more common dip tank hazards is in the PPE Selection Tool in the resource section of this chapter.

General Requirements

WAC 296-835-110

Summary

YOUR RESPONSIBILITY:

Safeguard employees working with dip tanks

You must

CONSTRUCTION

Construct safe dip tanks

WAC 296-835-11005 110-3

VENTILATION

Provide proper ventilation for the vapor area

WAC 296-835-11010 110-3

Take additional precautions if you recirculate ventilation system exhaust air into the workplace

WAC 296-835-11015 110-5

Take additional precautions when using an exhaust hood

WAC 296-835-11020 110-6

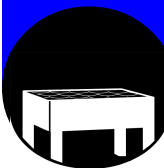
INSPECTION

Periodically inspect your dip tanks and associated equipment and correct any deficiencies

WAC 296-835-11025 110-6

-Continued-

General
Requirements



General Requirements

WAC 296-835-110

Summary

(Continued)

FIRST AID

Make sure employees working near dip tanks know appropriate first aid procedures

WAC 296-835-11030 110-7

CLEANING

Prepare dip tanks before cleaning

WAC 296-835-11035 110-8

CYANIDE

Safeguard cyanide tanks

WAC 296-835-11040 110-9

WELDING

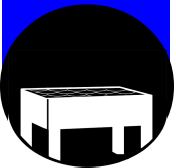
Protect employees during welding, burning or other work using open flames

WAC 296-835-11045 110-10

LIQUIDS HARMFUL TO SKIN

Provide additional protection for employees working near dip tanks that use liquid that may burn, irritate, or otherwise harm the skin

WAC 296-835-11050 110-11



General Requirements

WAC 296-835-110

Rule

CONSTRUCTION

WAC 296-835-11005

Construct safe dip tanks

You must

- Make sure dip tanks, including any drain boards, are strong enough to support the expected load.

VENTILATION

WAC 296-835-11010

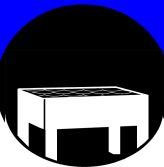
Provide proper ventilation for the vapor area

You must

- Make sure mechanical ventilation meets the requirements of one or more of the following standards:
 - NFPA 34-1995, Standard for Dipping and Coating Processes Using Flammable or Combustible Liquids
 - ACGIH's "Industrial Ventilation: A Manual of Recommended Practice" (22nd ed., 1995)
 - ANSI Z9.1-1971, Practices for Ventilation and Operation of Open-Surface Tanks and ANSI Z9.2-1979, Fundamentals Governing the Design and Operation of Local Exhaust Systems.

- Continued -

General
Requirements



General Requirements

WAC 296-835-110

Rule

WAC 296-835-11010 (Continued)



Note:

Some, or all, of the consensus standards (such as ANSI and NFPA) may have been revised. If you comply with a later version of a consensus standard, you will be considered to have complied with any previous version of the same consensus standard.

You must

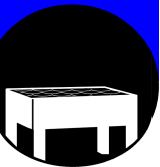
- Limit the vapor area to the smallest practical space by using mechanical ventilation.
 - Keep airborne concentration of any substance below 25% of its *lower flammable limit* (LFL).
 - Make sure mechanical ventilation draws the flow of air into a hood or exhaust duct.
 - Have a separate exhaust system for each dip tank if the combination of substances being removed could cause a:
 - Fire
 - Explosion
- OR**
- Potentially hazardous chemical reaction.



Reference:

You need to keep employee exposure within safe levels when the liquid in a dip tank creates an exposure hazard. See Air contaminants, WAC 296-62-075 through 296-62-07515.

-Continued-



General Requirements

WAC 296-835-110

Rule

WAC 296-835-11010 (Continued)



Note:

You may use a tank cover or material that floats on the surface of the liquid to replace or assist ventilation. The method or combination of methods you choose has to maintain the airborne concentration of the hazardous material and the employee's exposure within safe limits.

WAC 296-835-11015

Take additional precautions if you recirculate ventilation system exhaust air into the workplace

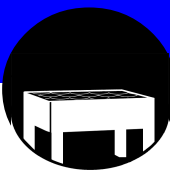
You must

- Only recirculate air that contains no substance at a concentration that could pose a health or safety hazard to employees.
- Make sure any exhaust system that recirculates air into the workplace:
 - Passes the air through a device that removes contaminants
 - Sounds an alarm and automatically shuts down the dip tank operation, if the vapor concentration of any substance in the exhaust air exceeds 25% of its *lower flammable limit (LFL)*
 - Monitors the concentration of vapor from flammable or combustible liquids with approved equipment



Note:

- The LFL concentration in the air must be determined after the air passes through the air-cleaning device and before the air re-enters the workspace.
- Most substances will pose a health hazard at a concentration far below 25% of its LFL.



General Requirements

WAC 296-835-110

Rule

WAC 296-835-11020

Take additional precautions when using an exhaust hood

You must

- Make sure each room with an exhaust hood has a source of outside air that:
 - Enters the room in a way that won't interfere with the function of the hood
 - Replaces at least 90% of the air taken in through the hood.

INSPECTION

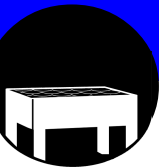
WAC 296-835-11025

Periodically inspect your dip tanks and associated equipment and correct any deficiencies

You must

- Inspect or test your dip tanks and associated equipment periodically, including:
 - Covers
 - Overflow pipes
 - Bottom drains and valves
 - Electrical wiring, equipment, and grounding connections
 - Ventilating systems
 - Fire extinguishing equipment
- Inspect the hoods and ductwork of the ventilation system for corrosion and damage and make sure the airflow is adequate:
 - At least quarterly during operation
 - Prior to operation after a prolonged shutdown

-Continued-



General Requirements

WAC 296-835-110

Rule

WAC 296-835-11025 (Continued)

You must

- Promptly fix any deficiencies found.



Note:

- To assist you in tracking your inspections and actions taken from those inspections, you may want to keep a written record.
- It is recommended that inspections be at least quarterly even if the system isn't operating. Depending on the chemicals in use more frequent inspection may be required.

FIRST AID

WAC 296-835-11030

Make sure employees working near dip tanks know appropriate first-aid procedures

You must

- Make sure your employees know the appropriate first-aid procedures for the hazards of your dipping and coating operations.



Note:

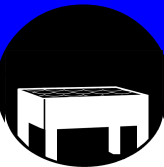
- First-aid procedures are contained in the Material Safety Data Sheet (MSDS) for the chemicals used in the dip tank.
- First-aid supplies appropriate for the hazards of the dipping or coating operation need to be located near the dip tank to be considered "readily available" as required by WAC 296-800-15020.

-Continued-

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General Requirements

WAC 296-835-110

Rule

WAC 296-835-11030 (Continued)



Reference:

There are additional requirements that may include providing emergency washing facilities and employee training. See First Aid, WAC 296-800-150, and Employer Chemical Hazard Communication, WAC 296-800-170, in the Safety and Health Core Rules, chapter 296-800 WAC.

CLEANING

WAC 296-835-11035

Prepare dip tanks before cleaning

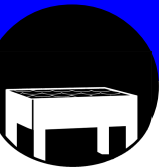
You must

- (1) Drain the contents of the tank and open any cleanout doors.
- (2) Ventilate the tank to clear any accumulated hazardous vapors.



Reference:

There may be requirements that apply before an employee enters a dip tank. See chapter 296-809 WAC, Confined space.



General Requirements

WAC 296-835-110

Rule

CYANIDE

WAC 296-835-11040

Safeguard cyanide tanks

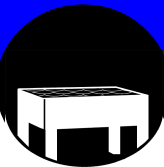
You must

- Provide a dike or other safeguard(s) to prevent cyanide from mixing with an acid, if a dip tank fails.



Note:

This would also apply to spills or other means by which cyanide could come in contact with an acid in sufficient quantity to produce a hazardous gas.



General Requirements

WAC 296-835-110

Rule

WELDING

WAC 296-835-11045

Protect employees during welding, burning, or other work using open flames

You must

- Make sure the dip tank and the area around it are thoroughly cleaned of solvents and vapors before performing work involving:
 - Welding
 - Burning**OR**
 - Open flames



Reference:

There are additional requirements for this type of work. See Welding, Cutting and Brazing, chapter 296-24 WAC, Part I, and chapter 296-842 WAC Respirators.

General Requirements

WAC 296-835-110

Rule

LIQUIDS HARMFUL TO SKIN

WAC 296-835-11050

Protect employees that use liquids that may burn, irritate, or otherwise harm the skin

You must

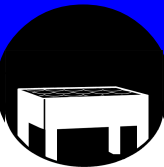
- (1) Make sure washing facilities, including hot water, are available for every 10 employees that work with dip tank liquids.
- (2) Satisfy medical requirements:
 - Make sure an employee with any small skin abrasion, cut, rash, or open sore receives treatment by a properly designated person.
 - Make sure an employee with a sore, burn, or other skin lesion that needs medical treatment, has a physician's approval before they perform their regular work.
 - Make sure employees who work with chromic acid receive periodic examinations of their exposed body parts, especially their nostrils.



Note:

- Periodic means on a yearly basis, unless otherwise indicated.
- Any time chromic acid spills onto an employee's skin or their clothing is saturated, a physician should be responsible for evaluating and monitoring the area where chromic acid made contact with the skin.

- Continued -



General Requirements

WAC 296-835-110

Rule

WAC 296-835-11050 (Continued)

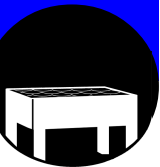
You must

- (3) Provide lockers or other storage space to prevent contamination of street clothes.



Reference:

You have to do a hazard assessment to identify hazards or potential hazards in your workplace and determine if PPE is necessary to protect your employees. See Personal Protective Equipment (PPE), WAC 296-800-160, in the Safety and Health Core Rules, chapter 296-800 WAC.



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Summary

IMPORTANT:

This section applies to:

- Flammable and combustible liquids (flashpoint below 200°F)
- Liquids that have a flashpoint of 200°F (93.3°C) or higher if you:
 - Heat the liquid
 - Dip a heated object in the tank



Reference:

Store flammable and combustible liquids as required by Flammable and Combustible Liquids, WAC 296-24-330, in the General Safety and Health Standards.

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Summary

YOUR RESPONSIBILITY:

Safeguard employees working with dip tanks containing flammable or combustible liquids

You must

CONSTRUCTION

Include additional safeguards when constructing dip tanks

WAC 296-835-12005 120-4

Provide overflow pipes

WAC 296-835-12010 120-4

Provide bottom drains

WAC 296-835-12015 120-6

FIRE PROTECTION

Provide fire protection in the vapor area

WAC 296-835-12020 120-7

Provide additional fire protection for large dip tanks

WAC 296-835-12025 120-8

-Continued-



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Summary

(Continued)

ELECTRICAL WIRING AND EQUIPMENT AND SOURCES OF IGNITION

Prevent static electricity sparks or arcs when adding liquids to a dip tank WAC 296-835-12035	120-10
Control ignition sources in the vapor area and adjacent area WAC 296-835-12040	120-10
Provide safe wiring and electrical equipment where the liquid can drip or splash WAC 296-835-12045	120-11

HOUSEKEEPING

Keep the area around dip tanks clear of combustible material and properly dispose of waste WAC 296-835-12050	120-12
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HEATING LIQUID

Make sure heating the liquid in your dip tanks doesn't cause a fire WAC 296-835-12055	120-13
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HEAT DRYING

Make sure a heating system used for drying objects doesn't cause a fire WAC 296-835-12060	120-14
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CONVEYORS

Make sure the conveyor system for dip tanks is safe WAC 296-835-12065	120-15
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Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

CONSTRUCTION

WAC 296-835-12005

Include additional safeguards when constructing dip tanks

You must

- (1) Make sure the dip tank, drain boards (if provided), and supports, are made of noncombustible material.
- (2) Make sure piping connections on drains and overflow pipes allow easy access to the inside of the pipe for inspection and cleaning.

WAC 296-835-12010

Provide overflow pipes

You must

- Provide an overflow pipe on dip tanks that:
 - Hold more than 150 gallons of liquid
- OR**
- Have more than 10 square feet of liquid surface area
- Make sure the overflow pipe is:
 - Properly trapped
 - Able to prevent the dip tank from overflowing
 - 3 inches or more (7.6 cm) in diameter
 - Discharged to a safe location

- Continued -



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12010 (Continued)



Note:

Discharged to a safe location could be a:

- Safe location outside the building

OR

- Closed, properly vented salvage tank or tanks that can hold more than the dip tank.

You must

- Make sure the bottom of the overflow pipe is at least 6 inches (15.2 cm) below the top of the tank.



Note:

The overflow pipe should be large enough to remove water applied to the liquid surface of the dip tank from automatic sprinklers or other sources in the event of fire. Smaller dip tanks should be equipped with overflow pipes, if practical.

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12015

Provide bottom drains



Exemption:

A bottom drain isn't required if:

- The viscosity of the liquid makes it impractical to empty the tank by gravity or pumping
- OR**
- The dip tank has an automatic closing cover that meets the requirements of WAC 296-835-12025.

You must

- Provide a bottom drain on all dip tanks that hold more than 500 gallons of liquid.
- Make sure the bottom drain:
 - Is properly trapped
 - Will empty the dip tank during a fire
 - Has pipes large enough to empty the tank within 5 minutes
 - Uses automatic pumps if gravity draining isn't practical
 - Is capable of both manual and automatic operation
 - Discharges to a safe location



Note:

Discharges to a safe location could be a:

- Safe location outside the building
- OR**
- Closed, properly vented salvage tank or tanks that can hold more than the dip tank.

-Continued-

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12015 (Continued)

You must

- Make sure manual operation of the bottom drain is performed from a safe and easily accessible location.

FIRE PROTECTION

WAC 296-835-12020

Provide fire protection in the vapor area

You must

- Provide a manual fire extinguisher near the tank that is suitable for putting out flammable and combustible liquid fires.

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12025

Provide additional fire protection for large dip tanks

You must

- Provide at least one automatic fire extinguishing system or an automatic dip tank cover if the tank:
 - Holds 150 gallons or more of liquid
- OR**
- Has 4 square feet or more of liquid surface area.
- Make sure automatic fire extinguishing systems or automatic dip tank covers meet the requirements of Table 1.



Exemption:

An automatic fire extinguishing system or an automatic dip tank cover isn't required for a hardening or tempering tank that:

- Holds less than 500 gallons

OR

- Has less than 25 square feet of liquid surface area.

-Continued-



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12025 (Continued)

Table 1: Automatic Fire Protection System Requirements

IF YOU PROVIDE	THEN YOU MUST
<p>An automatic fire extinguishing system</p>	<ul style="list-style-type: none"> - Use extinguishing materials suitable for a fire fueled by the liquid in the tank - Make sure the system protects the: <ul style="list-style-type: none"> - Tanks - Drain boards - Stock over drain boards.
<p>A dip tank cover</p>	<ul style="list-style-type: none"> - Make sure the cover is: <ul style="list-style-type: none"> - Closed by approved automatic devices in the event of fire - Able to be manually activated - Kept closed when the tank isn't being used - Made of noncombustible material or metal-clad material with locked metal joints.



Reference:

- Automatic fire extinguishing systems have specific requirements.
 - See:
 - WAC 296-24-622 for automatic dry chemical extinguishing system requirements
 - WAC 296-24-623 for automatic carbon dioxide extinguishing system requirements
 - WAC 296-24-627 for automatic water spray extinguishing system and automatic foam extinguishing system requirements.

Flammable or Combustible Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

ELECTRICAL WIRING AND EQUIPMENT AND SOURCES OF IGNITION

WAC 296-835-12035

Prevent static electricity sparks or arcs when adding liquids to a dip tank

You must

- Make sure any portable container used to add liquid to the tank is:
 - Electrically bonded to the dip tank
 - Positively grounded

WAC 296-835-12040

Control ignition sources

You must

- (1) Make sure the vapor areas and *adjacent areas* don't have any:
 - Open flames
 - Spark producing devices
 - Heated surfaces hot enough to ignite vapors
- (2) Use explosion-proof wiring and equipment in the vapor area.

-Continued-



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

WAC 296-835-12040 (Continued)



Reference:

Electrical wiring and equipment has to meet the requirements of the applicable hazardous (classified) location. See Hazardous (classified) locations, WAC 296-24-95613. Electrostatic equipment has specific electrical requirements. See WAC 296-835-13010.

You must

(3) Prohibit smoking in any vapor area:

- Post an easily seen "NO SMOKING" sign near each dip tank.

WAC 296-835-12045

Provide safe electrical wiring and equipment where the liquid can drip or splash

You must

- Make sure all electrical wiring and equipment in the vapor area is approved for areas that have:
 - Deposits of easily ignited residue
 - Explosive vapor



Exemption:

This doesn't apply to wiring that is:

- In rigid conduit, threaded boxes or fittings
- Has no taps, splices, or terminal connections.

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

HOUSEKEEPING

WAC 296-835-12050

Keep the area around dip tanks clear of combustible material and properly dispose of waste

You must

- (1) Make sure the area surrounding dip tanks is:
 - Completely free of combustible debris
 - As free of combustible stock as possible.

- (2) Provide approved metal waste cans that are:
 - Used for immediate disposal of rags and other material contaminated with liquids from dipping or coating operations
 - Emptied and the contents properly disposed of at the end of each shift.

Flammable or
Combustible
Liquids



120-12

1 • 800 • 4BE SAFE

(1 • 800 • 423 • 7233)

Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

HEATING LIQUID

WAC 296-835-12055

Make sure heating the liquid in your dip tanks doesn't cause a fire

You must

- Keep the temperature of the liquid in the dip tank:
 - Below the liquid's boiling point
 - At least 100°F below the liquid's *autoignition temperature*.

Flammable or
Combustible
Liquids



Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

HEAT DRYING

WAC 296-835-12060

Make sure a heating system used for drying objects doesn't cause a fire

You must

- Make sure the heating system used in a drying operation that could cause ignition:
 - Has adequate mechanical ventilation that operates before and during the drying operation
 - Shuts down automatically if a ventilating fan fails to maintain adequate ventilation
 - Is installed as required by NFPA 86-1999, Standard for Ovens and Furnaces.



Note:

Some, or all, of the consensus standards (such as ANSI and NFPA) may have been revised. If you comply with a later version of a consensus standard, you will be considered to have complied with any previous version of the same consensus standard.

Flammable or
Combustible
Liquids



120-14

1 • 800 • 4BE SAFE

(1 • 800 • 423 • 7233)

Additional Requirements for Dip Tanks Using Flammable or Combustible Liquids

WAC 296-835-120

Rule

CONVEYORS

WAC 296-835-12065

Make sure conveyor systems are safe

You must

- Make sure the conveyor system shuts down automatically if:
 - The ventilation system fails to maintain adequate ventilation
- OR**
- There is a fire.

Flammable or
Combustible
Liquids



Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Notes

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Summary

Specific
Processes



YOUR RESPONSIBILITY:

Safeguard employees working with dip tanks used for specific processes

You must

HARDENING OR TEMPERING

Meet specific requirements if you use a hardening or tempering tank
WAC 296-835-13005
130-3

ELECTROSTATIC EQUIPMENT

Meet specific requirements if you use electrostatic equipment
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130-5

FLOW COATING

Meet specific requirements if you use flow coating
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130-9

ROLL COATING

Take additional precautions if your roll coating operation uses a liquid that has a flashpoint below 140°F (60°C)
WAC 296-835-13020
130-10

-Continued-



Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Summary

(Continued)

VAPOR DEGREASING

Provide additional safeguards for vapor degreasing tanks

WAC 296-835-13025 130-11

SPRAY CLEANING OR DEGREASING

Control liquid spray over an open surface cleaning or degreasing tank

WAC 296-835-13030 130-12

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

Specific
Processes



HARDENING OR TEMPERING

WAC 296-835-13005

Meet specific requirements if you use a hardening or tempering tank

You must

- (1) Provide an automatic fire extinguishing system or an automatic dip tank cover for any hardening and tempering tank that uses flammable or combustible liquids and:
 - Holds 500 gallons (1893 L) or more of liquid

OR

 - Has 25 square feet (2.37 m²) or more of liquid surface area.
- (2) Prevent fires
 - Make sure hardening and tempering tanks are:
 - **Not** located on or near combustible flooring
 - Located as far away as practical from furnaces
 - Equipped with noncombustible hoods and vents (or equally effective devices) for venting to the outside.
 - Treat vent ducts as flues and keep them away from combustible material, particularly roofs.

-Continued-

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

WAC 296-835-13005 (Continued)

- (3) Make sure air under pressure isn't used to:
- Fill the tank
- OR**
- Agitate the liquid in the tank.
- (4) Equip each tank with an alarm that will sound when the temperature is within 50°F (10°C) of the liquid's flashpoint (alarm set point).
- (5) Make sure a limit switch shuts down conveyors supplying work to the tank when the temperature reaches the alarm set point, if operationally practical.
- (6) Have a circulating cooling system if the temperature of the liquid can exceed the alarm set point.



Note:

The bottom drain of the tank may be combined with the oil circulating system if the requirements for bottom drains in WAC 296-835-12015 are satisfied.

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

Specific
Processes



ELECTROSTATIC EQUIPMENT

WAC 296-835-13010

Meet specific requirements if you use electrostatic equipment

You must

- (1) Provide safe electrical equipment.
 - Make sure electrodes in your equipment are:
 - Substantial
 - Rigidly supported
 - Permanently located
 - Effectively insulated from ground by insulators
 - Make sure the insulators are:
 - Nonporous
 - Noncombustible
 - Kept clean and dry

-Continued-

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

WAC 296-835-13010 (Continued)

You must

- Make sure high voltage leads to electrodes are effectively:
 - Supported on permanent, suitable insulators
 - Guarded against accidental contact or grounding.
- (2)** Make sure transformers, powerpacks, control apparatus, and all other electrical parts of the equipment:
 - Are located outside the vapor area

OR

 - Meet the requirements of WAC 296-835-12040.



Exemption:

High voltage grids and their connections may be located in the vapor area without meeting the requirements of WAC 296-835-12040.

You must

- (3)** Safeguard paint detearing operations.
 - Use approved electrostatic equipment in paint detearing operations.
- (4)** Make sure goods being paint deteared are:
 - Supported on conveyors
 - **Not** manually handled.

-Continued-

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

Specific
Processes



WAC 296-835-13010 (Continued)

You must

- (5) Keep a minimum safe distance (twice the sparking distance) between goods being paint deteared and the electrodes or conductors of the electrostatic equipment at all times by:
- Arranging the conveyors to provide the necessary distance
 - Supporting the goods to prevent swinging or movement, if necessary
 - Post a sign that shows the minimum safe distance (twice the sparking distance) near the equipment, where it can be easily seen.
- (6) Keep paint detearing operations separate from storage areas and people by using fences, rails or guards that are:
- Made of conducting material
 - Adequately grounded.
- (7) Protect paint detearing operations from fire by installing:
- Automatic sprinklers
- OR**
- An approved automatic fire extinguishing system.
- (8) Collect and remove paint deposits by:
- Providing removable drip plates and screens
 - Cleaning these plates and screens in a safe location.

-Continued-

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

WAC 296-835-13010 (Continued)

You must

- (9) Make sure electrostatic equipment has automatic controls that immediately disconnect the power supply to the high-voltage transformer and signal the operator, if:
- Ventilating fans or equipment stop or fail for any reason
 - Conveyors don't work properly
 - A ground (or imminent ground) occurs anywhere in the high-voltage system
- OR**
- Goods being paint deteared come within twice the sparking distance of the electrodes or conductors of the equipment.

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

FLOW COATING

WAC 296-835-13015

Meet specific requirements if you use a flow coating process

You must

- (1) Make sure all piping is substantial and rigidly supported.
- (2) Make sure the paint is supplied by a:
 - Gravity tank that doesn't hold more than 10 gallons (38 L)

OR

 - Direct low-pressure pumping system.
- (3) Have an approved heat-actuated device that shuts down the pumping system if there is a fire.



Note:

The area of the sump, and any areas on which paint flows, should be included in the area of dip tank.





Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

ROLL COATING

WAC 296-835-13020

Take additional precautions if your roll coating operation uses a liquid that has a flashpoint below 140°F (60°C)

Important:

This section applies to the processes of roll coating, roll spreading, or roll impregnating that use a liquid having a flashpoint below 140°F (60°C). Material may be passed directly through a tank or over the surface of a roller that revolves partially submerged in the liquid.

You must

- Prevent sparks from static electricity by:
 - Bonding and grounding all metallic parts (including rotating parts) and installing static collectors
- OR**
- Maintaining a conductive atmosphere (one with a high relative humidity, for example) in the vapor area.

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

Specific
Processes



VAPOR DEGREASING

WAC 296-835-13025

Provide additional safeguards for vapor degreasing tanks

You must

- (1)** Make sure, if the tank has a condenser or a vapor-level thermostat, that it keeps the vapor level at least:
 - 36 inches (91 cm) below the top of the tank if the width of the tank is 72 inches or more

OR

 - 1/2 the tank width below the top of the tank if the tank is less than 72 inches wide.
- (2)** Make sure, if you use gas as a fuel to heat the tank liquid, that the combustion chamber is airtight (except for the flue opening) to prevent solvent vapors from entering the air-fuel mixture.
- (3)** Make sure the exhaust flue:
 - Is made of corrosion-resistant material
 - Extends to the outside
 - Has a draft diverter if mechanical exhaust is used.
- (4)** Take special precautions to keep solvent vapors from mixing with the combustion air of the heater if chlorinated or fluorinated hydrocarbon solvents (for example, trichloroethylene or freon) are used in the dip tank.

-Continued-

Additional Requirements for Dip Tanks Used for Specific Processes

WAC 296-835-130

Rule

WAC 296-835-13025 (Continued)

- (5) Keep the temperature of the heating element low enough to keep a solvent or mixture from:
- Decomposing
- OR**
- Generating excessive vapor.

SPRAY CLEANING OR DEGREASING

WAC 296-835-13030

Control liquid spray over an open surface cleaning or degreasing tank

You must

- Control the spray to the greatest extent feasible by:
 - Enclosing the spraying operation as completely as possible
 - Using mechanical ventilation to provide enough inward air velocity to prevent the spray from leaving the vapor area.



Note:

Mechanical baffles may be used to help prevent the discharge of spray.



Reference:

Spray painting operations are covered in Spray Finishing Using Flammable and Combustible Materials, WAC 296-24-370, and Spray-finishing Operations, WAC 296-62-11019.

Dipping and Coating Operations (Dip Tanks)

WAC 296-835-140

Definitions

ACGIH:

American Conference of Governmental Industrial Hygienists.

Adjacent area:

Any area within 20 feet (6.1 m) of a vapor area that isn't separated from the vapor area by tight partitions.

ANSI:

American National Standards Institute.

Approved:

Approved or listed by a nationally recognized testing laboratory. Refer to federal regulation 29 CFR 1910.7, for definition of nationally recognized testing laboratory.

Autoignition temperature:

The minimum temperature required to cause self-sustained combustion without any other source of heat.

Combustible liquid:

A liquid having a flashpoint of at least 100°F (37.8°C) and below 200°F (93.3°C). Mixtures with at least 99% of their components having flashpoints of 200°F (93.3°C) or higher aren't considered combustible liquids.

Detearing:

A process for removing excess wet coating material from the bottom edge of a dipped or coated object or material by passing it through an electrostatic field.

-Continued-



Dipping and Coating Operations (Dip Tanks)

WAC 296-835-140

Definitions

(Continued)

Dip tank:

A container holding a liquid other than plain water that is used for dipping or coating. An object may be immersed (or partially immersed) in a dip tank or it may be suspended in a vapor coming from the tank.

Flammable liquid:

Any liquid having a flashpoint below 100°F (37.8°C), except any mixture having components with flashpoints of 100°F (37.8°C) or higher, the total of which make up 99% or more of the total volume of the mixture.

Flashpoint:

The minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested by any of the measurement methods described in the definition of flashpoint in the Safety and Health Core Rules, WAC 296-800-370.

Lower flammable limit (LFL):

The lowest concentration of a material that will propagate a flame. The LFL is usually expressed as a percent by volume of the material in air (or other oxidant).

NFPA:

National Fire Protection Association.

-Continued-



Dipping and Coating Operations (Dip Tanks)

WAC 296-835-140

Definitions

(Continued)

Vapor area:

Any area in the vicinity of dip tanks, their drain boards or associated drying, conveying, or other equipment where the vapor concentration could exceed 25% of the lower flammable limit (LFL) for the liquid in the tank.

You:

Means the employer. See the definition of employer in the Safety and Health Core Rules, WAC 296-800-370.

Definitions



Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Notes

Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Resources

Helpful Tools

Dip Tanks PPE Selection Tool R-1

RESOURCES



Dip Tank PPE Selection Tool

Chapter 296-835 WAC

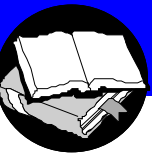
Resources

This tool can be used with the Hazard Assessment required by the Safety and Health Core Rules, Chapter 296-800 WAC, which requires you to select appropriate personal protective equipment (PPE). The table lists examples of PPE that can be used to protect employees from the hazards of dipping and coating operations.

Hazard	PPE to Consider
Employees' feet become wet with dip tank liquid	<ul style="list-style-type: none"> Shoes or boots of rubber or other material that can't be penetrated by dip tank liquid Rubber overshoes Wooden soled shoes
Employees handle work wet with dip tank liquid	<ul style="list-style-type: none"> Gloves¹ long enough to keep liquid from entering through the top of the gloves
<p>Employees' clothing may get wet with dip tank liquid</p> <p>Employees' clothing may get wet with dip tank liquid where small parts are cleaned, plated, or acid dipped in open tanks and rapid production work is required</p>	<ul style="list-style-type: none"> Aprons² Coats Jackets Sleeves <p>Any of the previous methods or:</p> <ul style="list-style-type: none"> Cotton clothing, shoes or short boots, and an apron
<p>Dip tank liquid may splash and cause damage to the eyes or face</p> <p>Note: This includes manually adding or removing chemicals from the tank.</p>	<ul style="list-style-type: none"> Tight-fitting chemical goggles Effective face shield

¹PPE selected has to be made of rubber or other material the dip tank liquid can't penetrate. Some materials can provide protection for a limited time, but needs to be replaced at intervals to maintain continuous employee protection.

²Aprons should be long enough to keep liquid from entering the top of the employees' boots or shoes.



Dipping and Coating Operations (Dip Tanks)

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- See also:
- Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI A9.2-1979
 - Industrial Ventilation: A Manual of Recommended Practice, ACGIH Standard (22nd ed., 1995)
 - Practices for Ventilation and Operation of Open-Surface Tanks, ANSI Z9.1-1971
 - Standard for Dipping and Coating Process Using Flammable or Combustible Liquids, NFPA 34-1995 (22nd ed., 1995)

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Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

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Dipping and Coating Operations (Dip Tanks)

Chapter 296-835 WAC

Statutory Authority

WAC

296-835-100 Scope.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-100, filed 07/17/02, effective 10/01/02.]

296-835-110 General requirements.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-110, filed 07/17/02, effective 10/01/02.]

296-835-11005 Construct safe dip tanks.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11005, filed 07/17/02, effective 10/01/02.]

296-835-11010 Provide proper ventilation for the vapor area.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11010, filed 07/17/02, effective 10/01/02.]

296-835-11015 Take additional precautions if you recirculate ventilation system exhaust air into the work place.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11015, filed 07/17/02, effective 10/01/02.]

296-835-11020 Take additional precautions when using an exhaust hood.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11020, filed 07/17/02, effective 10/01/02.]

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296-835-11025 Periodically inspect your dip tanks and associated equipment and correct any deficiencies.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11025, filed 07/17/02, effective 10/01/02.]

296-835-11030 Make sure employees working near dip tanks know appropriate first-aid procedures.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11030, filed 07/17/02, effective 10/01/02.]

296-835-11035 Prepare dip tanks before cleaning.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11035, filed 07/17/02, effective 10/01/02.]

296-835-11040 Safeguard cyanide tanks.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11040, filed 07/17/02, effective 10/01/02.]

296-835-11045 Protect employees during welding, burning, or other work using open flames.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11045, filed 07/17/02, effective 10/01/02.]

296-835-11050 Protect employees that use liquids that may burn, irritate, or otherwise harm the skin.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-11050, filed 07/17/02, effective 10/01/02.]

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296-835-120 Additional requirements for dip tanks using flammable or combustible liquids.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-120, filed 07/17/02, effective 10/01/02.]

296-835-12005 Include additional safeguards when constructing dip tanks.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12005, filed 07/17/02, effective 10/01/02.]

296-835-12010 Provide overflow pipes.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12010, filed 07/17/02, effective 10/01/02.]

296-835-12015 Provide bottom drains.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12015, filed 07/17/02, effective 10/01/02.]

296-835-12020 Provide fire protection in the vapor area.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12020, filed 07/17/02, effective 10/01/02.]

296-835-12025 Provide additional fire protection for large dip tanks.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12025, filed 07/17/02, effective 10/01/02.]

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296-835-12035 Prevent static electricity sparks or arcs when adding liquids to a dip tank.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12035, filed 07/17/02, effective 10/01/02.]

296-835-12040 Control ignition sources.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12040, filed 07/17/02, effective 10/01/02.]

296-835-12045 Provide safe electrical wiring and equipment where the liquid can drip or splash.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12045, filed 07/17/02, effective 10/01/02.]

296-835-12050 Keep the area around dip tanks clear of combustible material and properly dispose of waste.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12050, filed 07/17/02, effective 10/01/02.]

296-835-12055 Make sure heating the liquid in your dip tank does not cause a fire.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12055, filed 07/17/02, effective 10/01/02.]

296-835-12060 Make sure a heating system used for drying objects does not cause a fire.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12060, filed 07/17/02, effective 10/01/02.]

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296-835-12065 Make sure conveyor systems are safe.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-12065, filed 07/17/02, effective 10/01/02.]

296-835-130 Additional requirements for dip tanks used for specific processes.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-130, filed 07/17/02, effective 10/01/02.]

296-835-13005 Meet specific requirements if you use a hardening or tempering tank.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13005, filed 07/17/02, effective 10/01/02.]

296-835-13010 Meet specific requirements if you use electrostatic equipment.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13010, filed 07/17/02, effective 10/01/02.]

296-835-13015 Meet specific requirements if you use a flow coating process.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13015, filed 07/17/02, effective 10/01/02.]

296-835-13020 Take additional precautions if your roll coating operation uses a liquid that has a flashpoint below 140 degrees F (60 degrees C).

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13020, filed 07/17/02, effective 10/01/02.]

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296-835-13025 Provide additional safeguards for vapor degreasing tanks.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13025, filed 07/17/02, effective 10/01/02.]

296-835-13030 Control liquid spray over an open surface cleaning or degreasing tank.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-13025, filed 07/17/02, effective 10/01/02.]

296-835-140 Definitions.

[Statutory Authority: 49.17.010, .040, .050. 02-15-102 (Order 99-51), § 296-835-140, filed 07/17/02, effective 10/01/02.]