Backflow Prevention Program for Public Water Systems: Compliance

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This session will discuss expectations for implementation of a backflow prevention program for public water systems in Ohio. Focus will be on compliance issues.

October 9, 2024

Public Water Systems
Backflow Prevention Program
Compliance

- Backflow Prevention and Cross Connection Overview
- Rules and the requirements that pose compliance challenges
  - OAC Rules 3745-95-03, 95-04, 95-06, 95-07, 95-08
- Summary: Supplier Requirements and the Consumer's Role
- Common Backflow Prevention Program Issues
- Documentation to Have Available During a Sanitary Survey

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Backflow and Cross-Connection Control
Overview

Cross-Connection

- Any arrangement by which backflow can occur

Backflow

- Flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable water supply from any source other than the intended source of the potable water supply

  <u>Two types</u>

  - Backsiphonage
  - Backpressure

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Backflow and Cross-Connection Control *Overview*

RESPONSE NEEDED:

Address backflow hazards associated with water use practices from cross-connections to contaminants within plumbing systems and to public water supplies.

Necessary to maintain the quality of the public potable water supply from source to tap.

RESPONSIBILITY:

Shared among regulatory agencies (Ohio EPA and plumbing authorities), supplier of water (i.e., municipal PWS or single property-PWS owner), and the consumer.

Backflow Prevention and Cross-Connection Control

Overview

Containment principle

The installation of a backflow preventer (air gap or testable assembly) to protect contaminants from backflowing into the public water distribution system.

- Backflow preventer installed on the service line to the consumer's water system (unless otherwise specified in the rules).
- For single property or NTNC PWS, backflow preventer installed at cross connection.

Backflow Preventers

Air Gap/Water Loading Station Device

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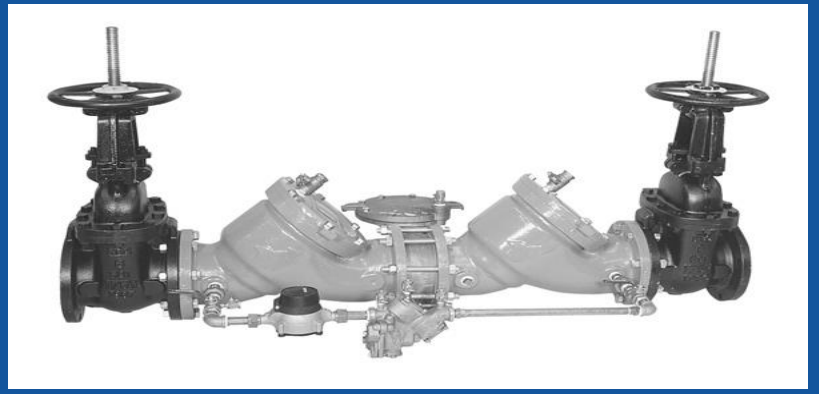
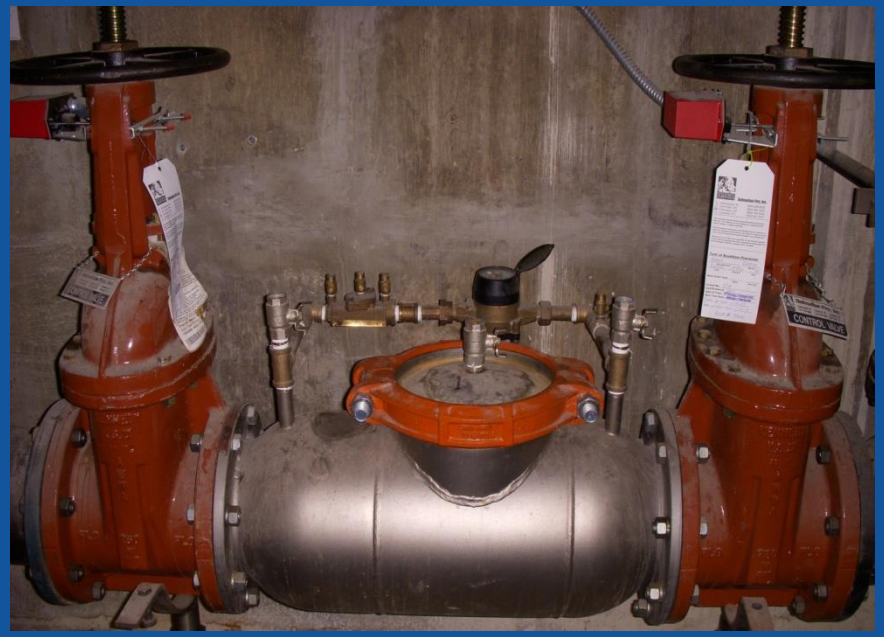
Reduced Pressure/Detector Assembly



Backflow Preventers

Double Check/Detector Check Assembly



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Isolation Only Devices

Ohio EPA's Backflow Prevention Rules

The following version of each of the rules within OAC Chapter 3745-95, effective October 10, 2022.

Rule #	Rule Title	Action
3745-95-01	Backflow Prevention and Cross Connection Control Definitions	Amend
3745-95-02	Backflow Prevention and Cross Connection Control	Amend
3745-95-03	Investigations and Surveys	New/Rescind
3745-95-04	Where Protection is Required	New/Rescind
3745-95-05	Type of Protection Required	Amend
3745-95-06	Backflow Preventers	New/Rescind
3745-95-07	Booster Pumps	Amend
3745-95-08	Deny or Discontinue Water Service	Amend
3745-95-09	Requirements of Yard Hydrants	New/Rescind

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Water Supplier Requirements

(OAC rule 3745-95-02)	• Develop and implement a backflow prevention and cross-connection control **program**
(OAC rule 3745-95-04 (B))	• Determine **if a backflow preventer is required** due to a pollutional, system, health, or severe health hazard
(OAC rule 3745-95-06 (B))	• **Approve the location** and manner in which the acceptable containment principle backflow preventer is installed
(OAC rule 3745-95-06 (C)(1))	• Supplier **retains authority** over any containment principle backflow preventer

3745-95-02 Backflow Prevention and Cross-Connection Control

No cross-connections to or within a public water system unless abated or controlled to the satisfaction of the supplier of water and in compliance with this chapter.

No cross-connection between a public water system or consumer's water system and an auxiliary water system unless the auxiliary water system, the method of connection, and the use of such system have been approved by the supplier of water and by the director.

Public water systems must have a backflow prevention program consistent with these rules.

- **Applies to ALL public water systems.**

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3745-95-04 Where Protection is Required Ohio EPA's Backflow Prevention Rules

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Approved backflow preventer must be installed where a pollution, system, health, or severe health hazard to the PWS exists	**Specifically required for high-hazard facilities.**	Specifically addresses auxiliary water systems.
• The backflow preventer is installed on the consumer's service line to the premises supplied by the public water system	• Hospitals, mortuaries, clinics, nursing homes, laboratories, docks and water-front facilities, sewage treatment plants and pumping stations, car washes, food processing or various industrial plants, and bulk water loading	• No connection of consumer's water system to an auxiliary water system (physically separate) • *Exception for fire protection purposes or an approved alternate source, as outlined in rule* • Also require a reduced pressure backflow preventer on consumer's service line

3745-95-05 Type of Protection Required

Designates the minimum level of backflow preventer necessary if a consumer's water use practices on the premises present an actual or potential hazard to the public water system.

Four degrees of hazards (*backflow preventer*)

- **Severe Health** hazard (*air gap*)
- **Health** hazard (*reduced pressure principal assembly*)
  Residential exception: Irrigation systems with no pumps or additives; approved pressure vacuum breaker
- **System** hazard (*reduced pressure principal assembly*)
- **Pollutional** hazard (*double check valve assembly*)

Supplier of water requires a backflow preventer which is commensurate with the degree of hazard.

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Type of Protection Required (95-05) & Acceptable Backflow Preventer (95-06)

Hazard Level	Assembly	Certification Number	Protection Provided
Severe Health	Approved Air-Gap Separation	ANSI 112.1.2	Backpressure Backsiphonage
Health System	Reduced Pressure Assembly	ASSE 1013 CSA B64.4 AWWA C511 USC – RP	Backpressure Backsiphonage
Health System *(Fire System Only)*	Reduced Pressure Detector Assembly	ASSE 1047 CSA B64.4.1 USC – RPDA	Backpressure Backsiphonage
Pollution	Double Check Valve Assembly	ASSE 1015 CSA B64.5 AWWA C510 USC – DCA	Backpressure Backsiphonage
Pollution *(Fire System Only)*	Double Check Detector Assembly	ASSE 1048 CSA B64.4.1 USC –DCDA	Backpressure Backsiphonage
Health *(Residential irrigation with no pumps and no additives, only)*	Pressure Vacuum Breaker	ASSE 1020	Backsiphonage Only

3745-95-06 *Backflow Preventers*

Installation Requirements

- Orientation per approval standard
- Readily accessible for inspection, testing, and repair
- Installed to prevent submergence
- Protected from freezing – heated enclosures meet ASSE 1060
- RPs not installed within a pit or vault below ground

Water Supplier Requirements

(OAC rule 3745-95-06 (C)(2))	• Ensure tests are done on assemblies every 12 months
(OAC rule 3745-95-06(D))	• Ensure no connection to auxiliary water system by verification every 12 months, keep an inventory
(OAC rule 3745-95-07)	• Ensure booster pump installations have a working minimum pressure sustaining method every 12 months, keep an inventory
(OAC rule 3745-95-03)	• The supplier must have right of entry to premises served by the public water system to conduct inspections

3745-95-06 *Backflow Preventers*

Testing Requirements

- Backflow preventers must be tested every 12 months and at the time of installation or repair
- The following must also be conducted at least every 12 months:
  - Certifying appropriate air gap;
  - Certifying physical separation of AWS
  - Testing that minimum pressure sustaining method on booster pumps are working properly

Auxiliary Water Systems

- If feasible, auxiliary water systems should be eliminated
- An interconnection between the consumer/PWS and an auxiliary water is prohibited unless the source is approved by supplier and Ohio EPA
- If your PWS provides a connection to a consumer with an auxiliary water source the PWS has 2 options to mitigate the hazard

  Option 1
  - Require a physical separation of auxiliary water system and consumer premise (document separation every 12 months)
  - Install a reduced pressure principle backflow prevention assembly on the consumer's line.

  Option 2 (exemption) only if:
  - AWS not on the premises served by PWS
  - No ease of cross connection due to distance
  - No other hazard

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3745-95-07 Booster Pumps

Must have a minimum pressure sustaining method to maintain at least 10 psi suction pressure.

- Non-fire (domestic) pumps
  - Low pressure cutoff controller which shuts down pump if suction pressure drops below set level
- Fire protection system pumps
  - Low suction throttling valve on discharge side – throttles flow to maintain pressure
  - Variable speed suction limiting control – slows pump down (output) to maintain pressure
  - Low pressure cutoff control (only if existing before 2008)

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3745-95-03 *Surveys and Investigations - Right of Entry* to Ohio EPA's Backflow Prevention Rules

- Supplier of water must have the right to enter at all reasonable times for the purpose of completing surveys and investigations of water use practices within the premises.

- Supplier of water has provisions in place that require consumer provide information on water use practices.

Water Supplier Requirements

Conduct **initial assessment and periodic surveys and investigation** of water use practices within consumer's premises

(OAC rule 3745-95-03)

Maintain **records** of **survey**, **investigation and** containment principle **backflow preventer installation reports**

(OAC rule 3745-95-06 (C))

Records of inspections, **tests, repairs,** and overhauls related to the containment principle **backflow preventer** shall be maintained by the supplier of water for a minimum of five years

(OAC rule 3745-95-06 (C))

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3745-95-03 *Surveys and Investigations*
Initial Assessment and Periodic Surveys

Public water systems must conduct an initial assessment of water use practices on the premises to determine degree of hazard and require appropriate backflow prevention.

Initial Assessment is required of ALL customers - existing and new.

- Onsite inspection is expected for those water use practices and facilities listed in OAC Rule 3745-95-04(B)(5) to ensure appropriate backflow prevention is installed.
- A survey questionnaire may be used to document water use practices if not one of the high-hazard facilities identified in rule. If a hazard is identified, an onsite inspection is required to ensure follow-through of requirements.
- Strictly residential customers, PWS may use alternate means to identify those customers who may represent a hazard instead of assessing each residential service.
    - If actual or potential hazard exists, PWS would conduct an onsite assessment.
    - Alternate means to identify residential hazards: review of residential building plans; visiting service areas for visual; flagging new businesses in residential areas; use of a questionnaire.

Assessment of New Installations

- Must have a mechanism in place to identify the need for backflow prevention on new service connections.
  - Is there communication between water department and Building/Health/ Plumbing department(s)?
- The supplier of water is responsible for the on-site investigation to confirm appropriate containment is in place for new installations.

Backflow Surveys and Investigations

OAC rule 3745-95-03 (B): Periodic Investigations or resurveys

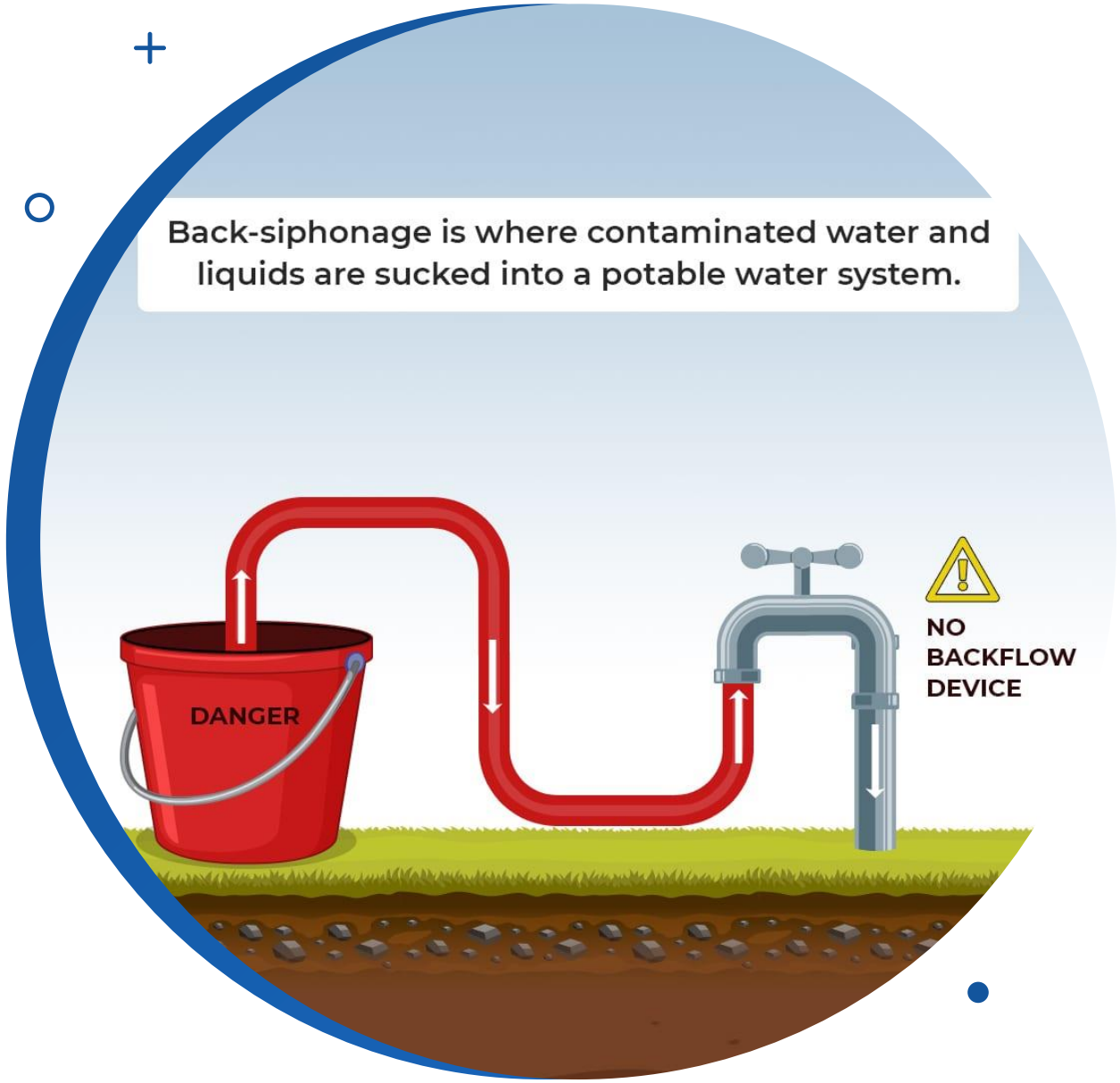
- **Conduct an on-site investigation of all premises at least every five years** to identify changes in water use practices at the consumer's property so that new or increased hazards to the water supply are identified and mitigated.

Alternative Methodologies

OAC rule 3745-95-03 (B)(2)

Instead of conducting an on-site investigation of all premises every five years, the **supplier of water can document, in writing, an alternate, ongoing, methodology to identify changes in water use practices that may represent a new or increased hazard to the public water supply.**

- An on-site investigation is required when a potential new or increased hazard is suspected to confirm the degree of risk and how it will be addressed.
- Information obtained through a water use survey questionnaire or in coordination with the local building, zoning, health, fire protection, and other licensing agencies may be used as an indicator of when an on-site investigation should be conducted.
- Other triggers, such as a request to the supplier of water for a new or additional service line, or an additional or larger meter should warrant an on-site investigation.



Backflow Surveys and Investigation - Residential

OAC rule 3745-95-03 (B)(3):

Residential premises unlikely to have hazards

- In lieu of conducting an on-site investigation of each residential premise, the supplier of water may **institute an ongoing educational campaign to inform consumers of common backflow hazards** created during residential water use.
- Information directly delivered annually at a minimum.
- Provide a reporting mechanism for suspected cross-connections.

Rule 3745-95-03 Surveys and Investigations

PWS demonstrates compliance with rule:

- Provide record or evidence that an assessment was made for existing services.
- PWS must have a procedure for assessing new service connections.
- PWS conducts investigations and surveys every five years or per a written methodology.
- Per 95-06: Keep records of inventory of contaminant backflow preventer installation, the initial assessment, and the periodic surveys or investigations for each customer. Keep as long as condition exists for that customer.
- Written methodologies and records made available to inspector for review.
- If using exemption for initial assessment and periodic survey for residential customers:
  - Written procedure for the alternate methodology used to capture residential hazards.
  - Evidence of educational material sent out annually.
  - Means for customers to notify PWS of cross-connections and follow up by PWS (if any).

Water Supplier Requirements

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Supplier can deny or discontinue water service if backflow program requirements not met	• *Water is not to be restored until the issue has been corrected/eliminated to the satisfaction of the supplier*
Backflow prevention training & certification for staff	• *Concepts, testing procedures, identifying hazards, conducting surveys*

3745-95-08 Deny or Discontinue Service

After reasonable notice, supplier of water must deny or discontinue the water service to any premises when:

1	A backflow preventer required is not installed, tested, and maintained in an acceptable manner.
2	The backflow preventer has been removed or bypassed.
3	An unprotected cross-connection exists on the premises.
4	A required minimum pressure sustaining method on a booster or fire pump is not installed or maintained in working order.
5	Denied entry to determine compliance with OAC Chapter 3745-95.

Backflow Ordinance

- Does your water system have local ordinances, by-laws, rules, contracts, and other legally enforceable mechanisms?
- Has it been updated recently?
- Does it address:
  - Right of entry
  - Discontinuance of service
  - Auxiliary water systems
  - Booster pumps

Homework: Obtain city or village's backflow ordinance and review it with your legal department.

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Consumer Requirements

- Provide supplier information on **water use practices**
  - (OAC rule 3745-95-03 (C))
- Maintain preventer in **proper working order** and **continuous operation**
  - (OAC rule 3745-95-06 (C))
- **Cover the expense** of the
  - required backflow assembly (OAC rule 3745-95-06 (B))
  - repair/replacement of assembly (OAC rule 3745-95-06 (C)(4))
  - Annual testing of the assembly (OAC rule 3745-95-06 (C)(3))
    - By a person/company approved by the supplier
- Maintain records of tests/repairs and provide to supplier
  - OAC rule 3745-95-06 (C)(5))

Common Issues

Backflow Prevention Program Deficiencies

- Lack of records for initial assessments of existing services or not completed.
- Backflow preventers not inspected and/or tested every 12 months.
- Periodic surveys and investigations of customer's premises served by public water system are not being conducted.
- Lack of a written, enforceable backflow prevention program.
- Record-keeping issues (inaccessible, missing, or incomplete records).

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Violations/Resolve

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Lack of documentation of initial assessment.

A PWS required 500 out of 1,000 services to have a backflow preventer installed.

Cited a violation of OAC Rule 3745-95-03.

PWS must explain steps that will be taken to resolve it and provide a schedule.

The violation can be resolved once PWS completes initial assessments and has the documentation.

Prioritize onsite inspection for high-risk facilities.

Others, at least a survey questionnaire (unless meet residential exemption).

Guidelines for Backflow Prevention at Permanent Bulk Water Loading Stations and Temporary Hydrant Use for Bulk Water Loading

Backflow Prevention at Water Loading Stations

Bulk water loading stations require detail plan submission and approval.

- Air Gap on PWS Bulk Water Supply Line
- For water loading stations where a top load design with an air gap on the PWS's supply line is determined to not be feasible, all must apply:
  - Variance acceptance by Ohio EPA;
  - Protection by a reduced pressure principle backflow prevention assembly (RP) on the PWS supply line
  - PWS enforces air gaps on vessels being filled by the water hauler
  - Special administrative controls are in place for selective access to loading station

https://dam.assets.ohio.gov/image/upload/epa.ohio.gov/Portals/28/documents/pws/Backflow_Prevention_Hydrant_Bulk_Water_Loading_Guidance_v7.pdf

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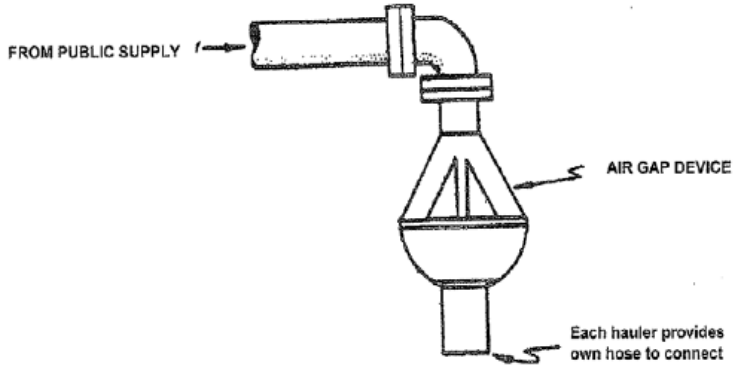
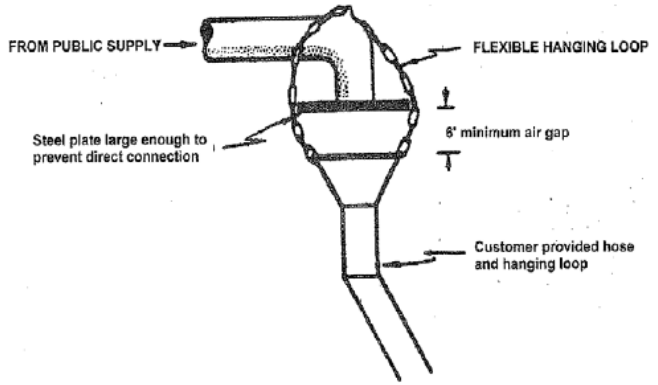
Air Gap at Bulk Water Stations





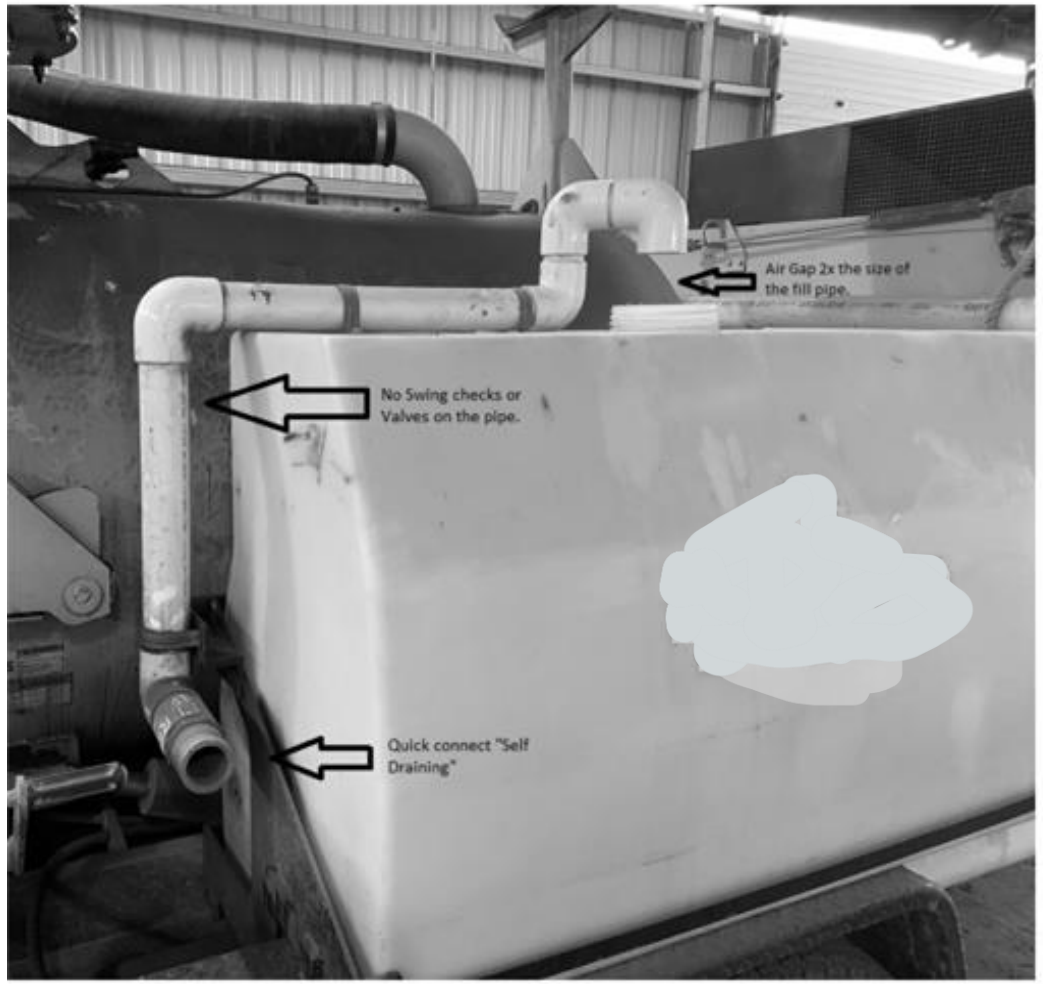
Guidelines for Backflow Prevention at Permanent Bulk Water Loading Stations and Temporary Hydrant Use for Bulk Water Loading

Minimum protection where hydrants are used for bulk water loading

The following applies:

- An air gap must be provided at the fill location on the vessel due to the potential hazards, as required by OAC Chapter 3745-95.
- A PWS-supplied RP must be used at the fill hydrant connection to ensure appropriate backflow prevention is provided in the event the air gap is compromised.
- To ensure air gaps are provided, the PWS must inspect the air gaps for users at least once every 12 months and maintain records of these inspections.

Guidelines for Backflow Prevention at Permanent Bulk Water Loading Stations and Temporary Hydrant Use for Bulk Water Loading



Information/Documentation Made Available During the Sanitary Survey

- A copy of your backflow ordinance or other legal mechanism(s)
- # of service connections (breakdown of commercial, municipal, and residential)
- # of containment backflow preventers installed
- # of containment backflow preventers tested in the previous calendar year

Information/Documentation Made Available During the Sanitary Survey

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- Containment backflow preventer test records received since the last sanitary survey
- Examples of test reminder letters, warning letters, and shut-off notices sent out in the previous calendar year
- Examples of the on-site surveys (or your PWS alternate methodology)
- Documentation of the PWS ongoing educational program to inform consumers of common residential backflow hazards
- Documentation of the PWS reporting mechanism for suspected cross-connections

Additional Backflow Prevention Resources

- epa.ohio.gov/divisions-and-offices/drinking-and-ground-waters/engineering-plan-approval

  DDAGW/Engineering and Plan Approval/ 'Backflow Prevention and Cross Connection Control' tab

- Ohio EPA's Backflow Prevention Educational Brochure: https://epa.ohio.gov/static/Portals/28/documents/pws/PWS-02-003%20brochure.pdf

- Ohio EPA Backflow Prevention Manual:

  https://epa.ohio.gov/static/Portals/28/documents/rules/proposed/BFP-Manual_Final_Sept2015.pdf

Thank You

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