

# Backflow Prevention

## Rule Update



Water Distribution Systems Workshop  
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# Backflow Prevention

## Rule Update



- OVERVIEW OF BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL CONCEPTS
- REGULATORY OVERVIEW AND UPDATES ON PROPOSED RULE REVISIONS
- OVERVIEW OF REVISIONS PROPOSED TO OHIO EPA'S BACKFLOW PREVENTION MANUAL

*Is About Protecting Our Public Water Supply*

# Backflow and Cross-Connection Control Overview



## **CROSS- CONNECTION**

Physical link or route that makes it possible for contamination to flow into the potable water system

## **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.

# Backflow and Cross-Connection Control *Overview*



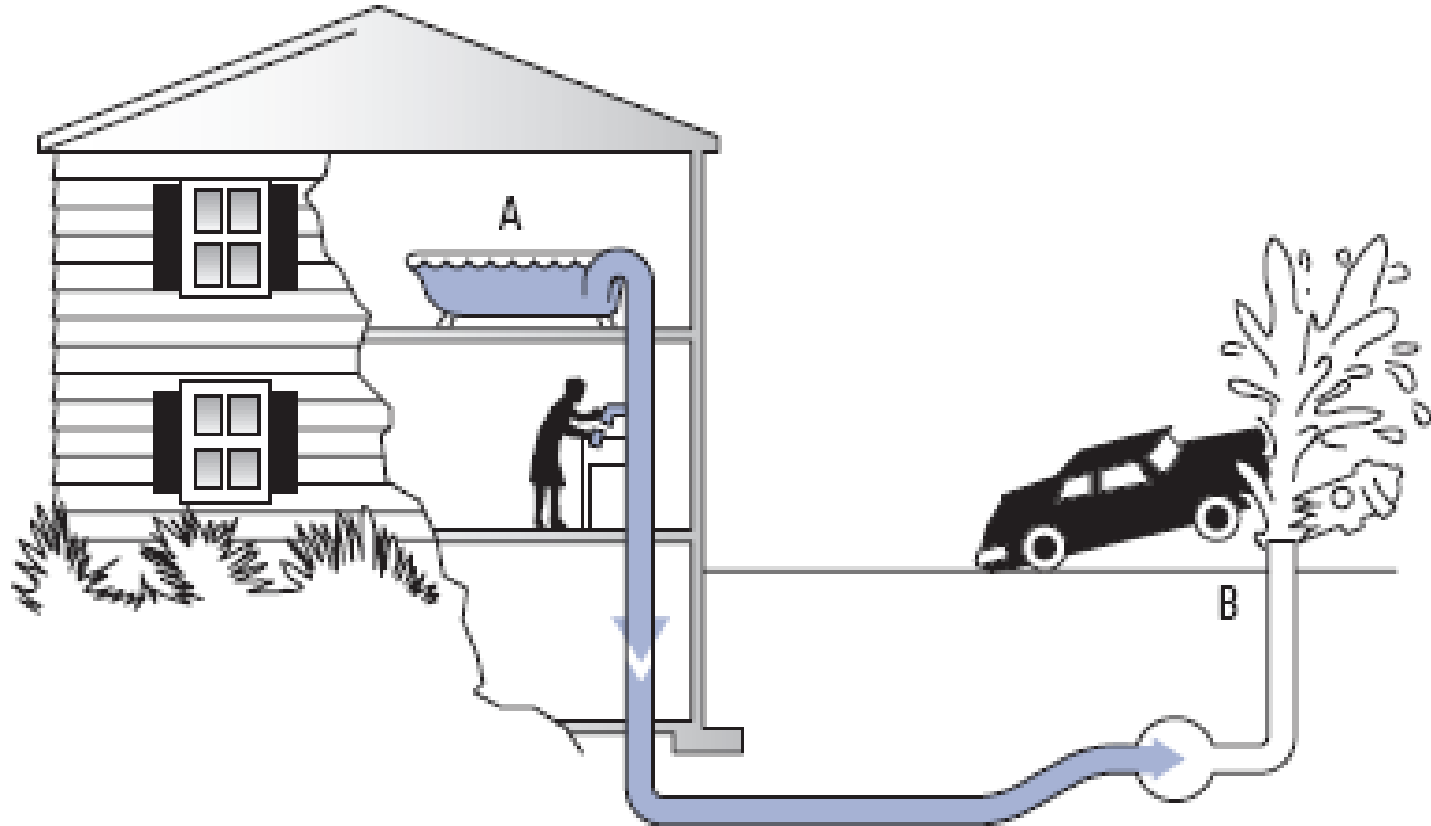
## **BACKSIPHONAGE –**

Reversal of flow due to negative gauge pressure condition in the piping allowing contaminants to be siphoned into the drinking water supply

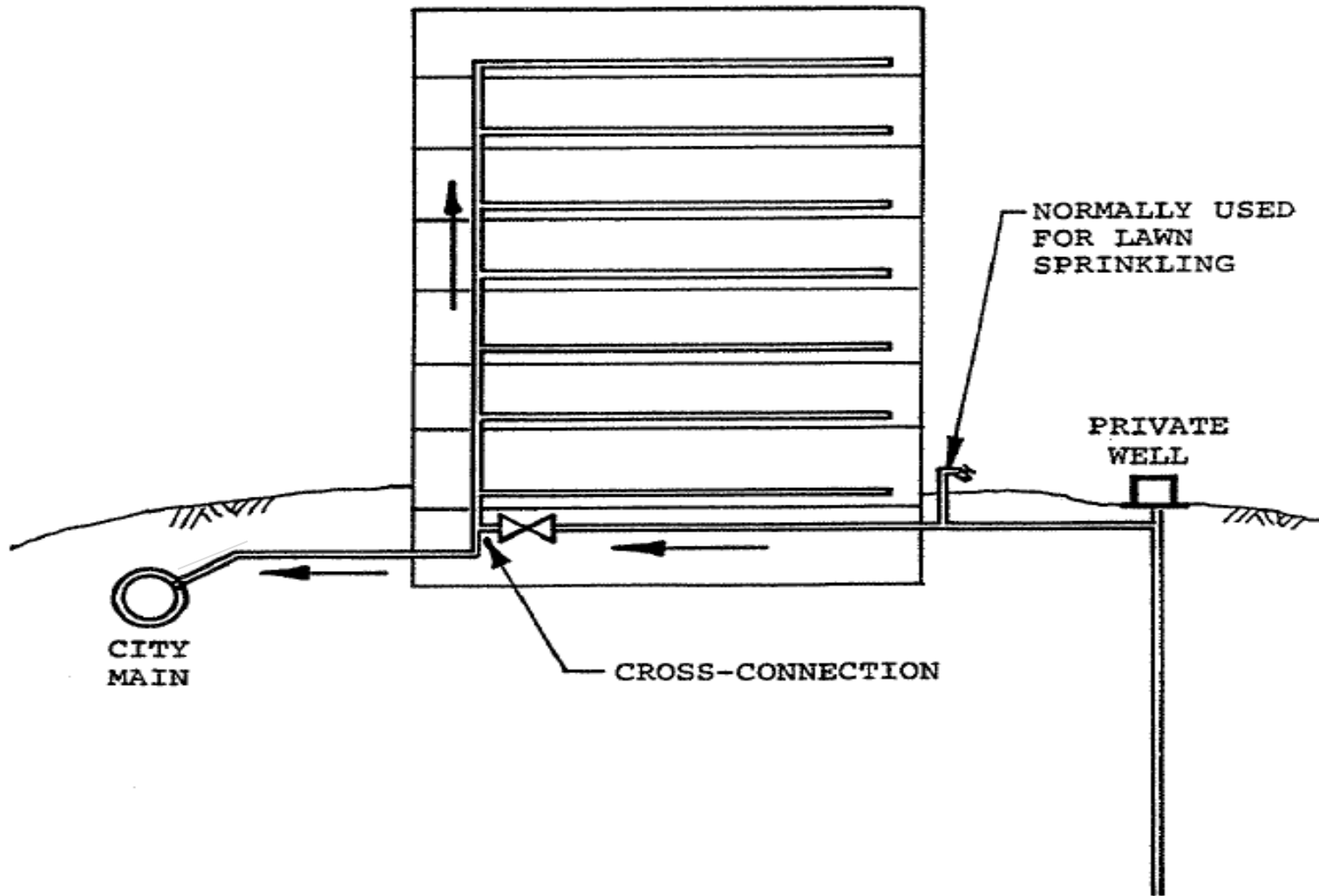
## **BACKPRESSURE –**

Reversal of flow due to an opposing pressurized system which overcomes the public drinking water supply pressure allowing movement of contaminants into the drinking water supply

# Backsiphonage



# Backpressure



# Backflow and Cross-Connection Control Overview



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## CONTAINMENT PRINCIPLE –

The installation of a backflow prevention assembly on the consumer's service line (typically at meter) to protect contaminants from backflowing into the public water distribution system.

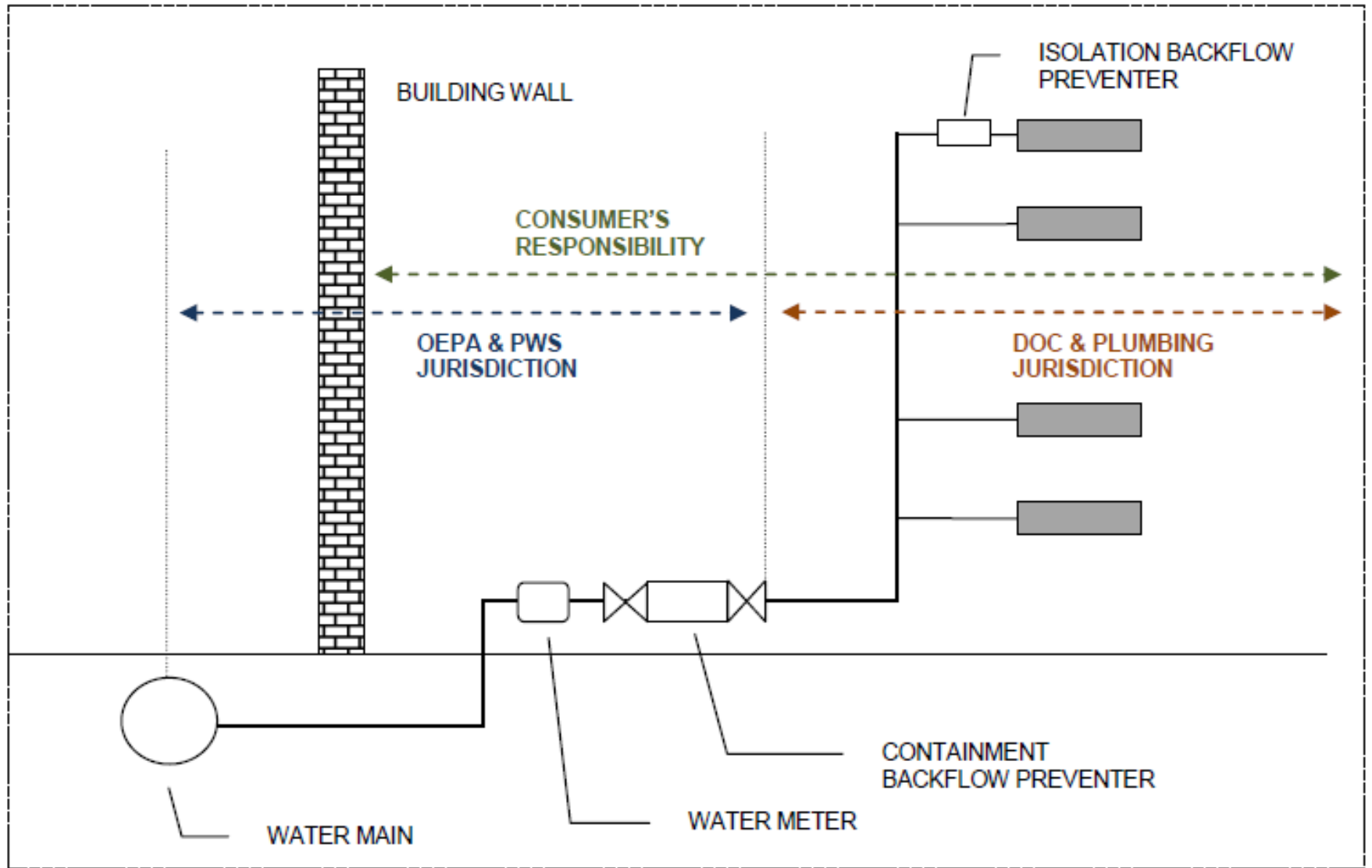
*OEPA/ water supplier jurisdiction*

## ISOLATION PRINCIPLE –

The installation of individual fixture devices or “air gaps” which isolate the cross-connection at the possible source of contamination to protect the consumer's potable water supply

*ODOC/local plumbing authority jurisdiction*

# Shared Responsibility





# Backflow and Cross-Connection Control *Overview*



## **INCIDENCES**

### **▪FEBRUARY 2004 – CENTRAL OHIO**

**Turbid water led to company officials discovering a cross-connection between the public water supply and a coolant line that drew water from holding ponds**

### **▪OCTOBER 2004 – NORTHEAST OHIO**

**Residents were instructed to use bottled water after the village public water system was contaminated with fertilizer from a tanker truck cross connection with a fire hydrant**

# Backflow and Cross-Connection Control *Overview*



## **OBJECTIVE**

**Comprehensive backflow prevention and cross-connection control program to address backflow hazards posed by cross-connections in plumbing systems and to public water supplies**

## **RESPONSIBILITY**

**Shared among regulatory agencies, supplier of water, local plumbing authorities and the consumer**

# Backflow and Cross-Connection Control *Overview*



STATE OF OHIO RULES AND REGULATIONS PERTAINING TO  
BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL

## Ohio EPA Legal Authority

**Ohio Revised Code:**

**Sections 6109.13, 6109.07, 6109.04**

**Ohio Administrative Code:**

**Chapter 3745-95 (95-01 to 95-09)**



Environmental  
Protection Agency



## Backflow Prevention Rules

### Proposed changes:

Ohio Administrative  
Code 3745 -95-01

-95-02

-95-03

-95-05

-95-06

-95-07

These changes will go  
out for public comment  
again. *Not effective yet.*

Access draft rules on  
OEPA website.



## *Rules and Effective Dates*

### Chapter 3745-95: Backflow Prevention and Cross- Connection Control

- 3745-95-01 (*19 April 2012*) Definitions.
- 3745-95-02 (*1 May 2003*) Cross-connections.
- 3745-95-03 (*26 November 1980*) Surveys and investigations.
- 3745-95-04 (*1 May 2003*) Where protection is required.
- 3745-95-05 (*1 May 2003*) Type of protection required.
- 3745-95-06 (*1 May 2003*) Backflow prevention devices.
- 3745-95-07 (*8 August 2008*) Booster pumps.
- 3745-95-08 (*26 November 1980*) Violations.
- 3745-95-09 (*19 April 2012*) Requirements for yard hydrants

# Backflow Prevention

## Rule Revisions: 95-01



### CHAPTER 3745-95-01- *DEFINITIONS*

- Add definition for containment principle

#### **CONTAINMENT PRINCIPLE BACKFLOW PREVENTER –**

Installed in a consumer's water system, to contain water within the premises, to prevent polluted or contaminated water from backflowing into the public water system.

Typically at service connection, unless placement otherwise specified in rule. Protect public water system supply.

#### **VS. ISOLATION –**

Protect the consumer's potable water supply

# Backflow Prevention

## *Rule Revisions: 95-01, -02*



### **CHAPTER 3745-95-01- DEFINITIONS (CON'T)**

- Change backflow prevention device to backflow preventer
- Add definition for pressure vacuum breaker

*Revisions being made to be consistent with terms used in backflow prevention manual and in practice.*

### **CHAPTER 3745-95-02- BACKFLOW PREVENTION AND CROSS CONNECTION CONTROL**

- Add statement that PWSs must have a backflow prevention program consistent with these rules.

# Backflow Prevention

## *Rule Revisions: 95-03*



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### CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

- Set a frequency for periodic survey or investigation
- Rule language drafted among interested party group (small and large PWSs and ODOC-plumbing & building standards)

#### ***Proposed Rule language:***

- Conduct an initial assessment
- Conduct periodic surveys or investigations of water use practices within a consumer's premises
- DETERMINE WHETHER THERE ARE ACTUAL OR POTENTIAL CROSS-CONNECTIONS TO THE CONSUMER'S WATER SYSTEM THROUGH WHICH CONTAMINANTS OR POLLUTANTS COULD BACKFLOW INTO THE PUBLIC WATER SYSTEM.

# Backflow Prevention Rule Revisions: 95-03



## CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

### ***Proposed Rule language (con't):***

TO MEET RESURVEY REQUIREMENT, THE SUPPLIER OF WATER MUST:  
Conduct onsite investigation of all premises every five years to identify changes in water use practices that require mitigation

**OR,**

Identify in writing, develop and implement, an alternate, on-going methodology 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.



# Backflow Prevention Rule Revisions: 95-03



## CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

### *Proposed Rule language (con't):*

Alternate written process must specify that:

AN ON-SITE INVESTIGATION IS REQUIRED WHEN A NEW OR INCREASED HAZARD IS SUSPECTED TO CONFIRM DEGREE OF RISK AND HOW IT WILL BE ADDRESSED.

# Backflow Prevention

## Rule Revisions: 95-03



### CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

#### ***Proposed Rule language (con't):***

Process includes how on-going information will be obtained and used, such as:

INFORMATION OBTAINED THROUGH A WATER USE SURVEY QUESTIONNAIRE OR IN COORDINATION WITH THE LOCAL BUILDING, ZONING, HEALTH, AND OTHER LICENSING AGENCIES MAY BE USED AS AN INDICATOR OF WHEN AN 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 INVESTIGATION.

# Backflow Prevention

## Rule Revisions: 95-03



### CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

#### ***Proposed Rule language (con't):***

IN LIEU OF CONDUCTING A SURVEY OR INVESTIGATION OF EACH RESIDENTIAL PREMISES WITHOUT A LIKELY HAZARD, THE SUPPLIER OF WATER MAY INSTITUTE AN ON-GOING EDUCATIONAL CAMPAIGN TO INFORM CONSUMERS OF COMMON BACKFLOW HAZARDS CREATED DURING RESIDENTIAL WATER USE AND PROVIDE A REPORTING MECHANISM FOR SUSPECTED CROSS CONNECTIONS.

AN EDUCATION CAMPAIGN MAY USE LOCAL MEDIA AND ADVERTISING RESOURCES, BUT MUST ALSO INCLUDE INFORMATION DELIVERED, EITHER ELECTRONICALLY OR HARD COPY, TO EACH RESIDENTIAL SERVICE CONNECTION AT LEAST ANNUALLY.



# Backflow Prevention

## Rule Revisions: 95-03



### CHAPTER 3745-95-03 – SURVEYS AND INVESTIGATIONS

#### **Summary:**

- Conduct onsite investigation every 5 years (industrial, commercial, institutional and at-risk residential premises); Apply residential educational campaign with reporting mechanism for cross connections. **OR....**
- Written process that is performance-based, utilizes ongoing collection of information and built on triggers:
  - *Collaborate with local permitting authorities (building, plumbing, health, fire)*
  - *Send out survey questionnaires to collect information on water use practices*
  - *Act on requests for new or additional service line or additional/larger meter*
  - *Apply residential educational campaign and reporting mechanism, per rule*

# Backflow Prevention

## *Rule Revisions: 95-05*



### CHAPTER 3745-95-05 – TYPE OF PROTECTION REQUIRED

***Include alternative for water-only, residential irrigation system:***

WATER-ONLY, RESIDENTIAL-TYPE IRRIGATION SYSTEM

-Not Subjected To Backpressure

-No Additives

AN APPROVED PRESSURE VACUUM BREAKER CAN BE USED TO ISOLATE THE SERVICE LINE TO THE IRRIGATION SYSTEM IN LIEU OF INSTALLING A CONTAINMENT ASSEMBLY AT THE SERVICE CONNECTION.

-Same Maintenance And Testing Requirements

CAN STILL REQUIRE CONTAINMENT PROTECTION AT THE SERVICE CONNECTION

# Backflow Prevention

## *Rule Revisions: 95-06*



### CHAPTER 3745-95-06 – BACKFLOW PREVENTION DEVICES

**Update standards references for acceptable backflow prevention assemblies.**

Refer to those in Ohio Building Code-Plumbing Rule, where applicable, so keep consistency in standard edition. **Add PVB.**

**Specify records retention:**

- THE SUPPLIER OF WATER SHALL MAINTAIN AN INVENTORY OF SURVEY, INVESTIGATION AND BACKFLOW PREVENTION DEVICE INSTALLATIONS.
- RECORDS OF INSPECTIONS, TESTS, REPAIRS AND OVERHAULS SHALL BE MAINTAINED BY THE SUPPLIER OF WATER FOR A MINIMUM OF FIVE YEARS.

# Backflow Prevention

## *Rule Revisions: 95-07*



### **CHAPTER 3745-95-07 – BOOSTER PUMPS**

*Modifications requested by Board of Building Standards & Ohio Dept. of Commerce-Plumbing; State Fire Marshal; and, Fire pump supplier.*

- Allow install at 1,2 and 3 family dwellings with minimum suction pressure control. Plumbing will require condition of obtaining a *certificate of occupancy*, based on notification to PWS of pump install and successful testing of the low pressure cut-off.
- Incorporate variable speed suction limiting control as alternate minimum suction pressure control mechanism on fire pump installations.
- *Changes are consistent with Ohio Building Standards (plumbing) and State Fire Code (NFPA 20 standards for fire pumps).*

# Backflow Prevention

## *Rule Revisions: 95-07*



### **CHAPTER 3745-95-07 – BOOSTER PUMPS**

#### ***Summary:***

- Lift prohibition on 1,2 and 3 family dwellings. Plumbing will require low pressure cut-off and notify PWS of pump install and initial test result.
- *Continue to recommend address low pressure problem areas through distribution fixes, rather than individual premises fixes*
- Fire pumps have two options now:
  - Low suction throttling valve set to maintain 10 psi or more at suction side of pump
  - Variable speed suction limiting control which reduces pump speed to maintain pressure at 10 psi or more at suction side of pump





Backflow  
Prevention and  
Cross Connection  
Control Manual,  
Third Edition 1987,  
Revised 1990.

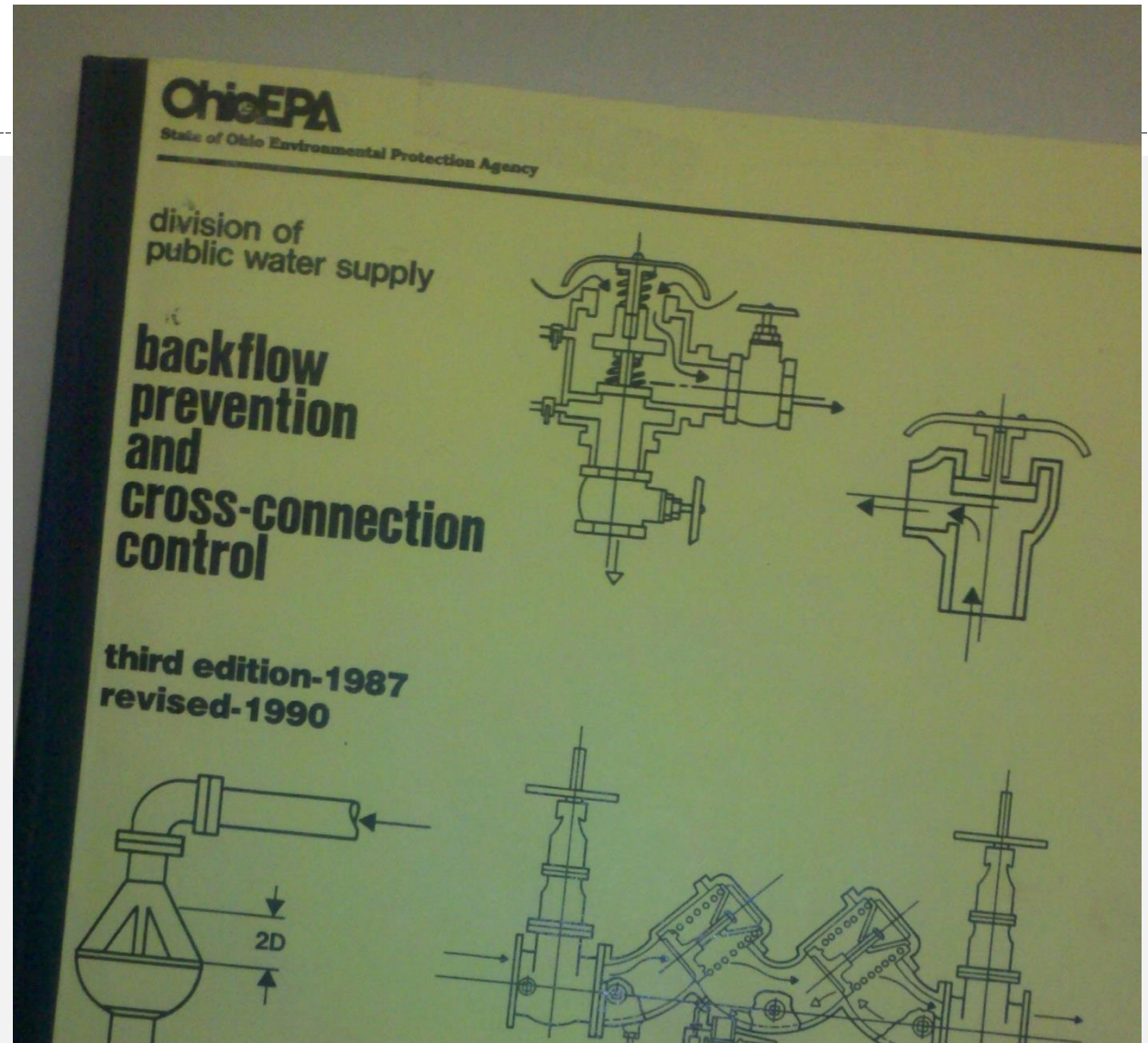
Manual Revisions:

Rule Changes

New Policy

New Guidance

COMING SOON!



# Revisions to OEPA Backflow Prevention Manual



1. Rearranged material and added a section to the Manual
2. Addressed reoccurring/hot topics and guidance developed since last revision.
3. Added Pictures and Illustrations
4. Updated test procedures and forms. Made consistent with ODOC-Plumbing
5. Updated rules and regulations
6. Expanded Appendices (to include supporting information and referenced guidance documents)

# Major Sections of BFP Manual (Revised)



1. The Problem
  2. Backflow and Cross-Connection Theory and Concepts
  3. Cross-Connection Control Program Authority and Rules
  4. Backflow Preventers (types)
  5. Degree of Hazard and Methods for Control
  6. Components of a Backflow Prevention Program
- Appendices (supporting information and guidance)

# Backflow Preventers

- Air Gap

- Air gap discharge
- Bulk water loading station air gap device

- Assemblies

- Reduced Pressure Principle Backflow Prevention Assembly
- Reduced Pressure Detector Check Assembly
- Double Check Assembly
- Double Check Detector Check Assembly

- Devices

- Dual Check
- Hose Bibb Vacuum Breaker
- Atmospheric Vacuum Breaker
- Pressure Vacuum Breaker

- Specific Valving/ Piping Configuration

- Interchangeable Connection (four-way valve or swing connector)
- Barometric Loop

# Degree of Hazard & Methods for Backflow Prevention and Cross-Connection Control



## *PROTECTION NEEDED FOR THE DEGREE OF HAZARD*

### **Severe Health Hazard**

Cause severe morbidity or death

### **Health Hazard**

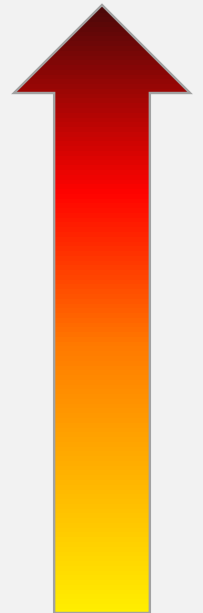
Danger to health

### **System Hazard**

Cause damage to components of water system

### **Pollution hazard**

Aesthetically objectionable or degrading to quality of water



# Degree of Hazard & Methods for BFP and X-Conn. Control

<u>Hazard Level</u>	<u>Assembly</u>	<u>Certification Number</u>	<u>Protection Provided</u>
Severe Health	Approved Air-Gap Separation	ANSI 112.1.2	Backpressure Backsiphonage
Health System	Reduced Pressure Assembly	ASSE 1013 AWWA C511 CSA B64.4 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 AWWA C510 CSA B64.5 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 additives only*) *conditional	Pressure Vacuum Breaker	ASSE 1020	Backsiphonage Only

# Degree of Hazard & Methods for Backflow Prevention and Cross- Connection Control



## ***SPECIFIC WATER USE PRACTICES OF CONCERN:***

**AUXILIARY WATER SYSTEMS**

**FIRE PROTECTION**

**BOOSTER PUMPS**

**DUAL WATER SUPPLIES**

**PLUMBING SYSTEMS**

**MISC. HAZARDS**

*(water-operated devices, yard hydrants, geothermal,  
gray water)*

# Degree of Hazard & Methods for BFP and X-conn Control



## AUXILIARY WATER SYSTEMS (AWS)

- **Physically separate & require a reduced pressure principle backflow prevention assembly (RP) at the service connection, or eliminate AWS.**
- **If on property, off premises, no risk of cross-connection of public water system with AWS, could implement alternative to RP**
  - **Outlined in rule and guidance provided in implementing this alternative**



# Degree of Hazard & Methods for BFP and X-conn Control



## BOOSTER PUMPS

- Incorporate rule changes
- No prohibition for 1,2,3 family dwellings.
  - Must apply low pressure cut-off requirement
- Update test procedure for low suction throttling valve and variable speed suction limiting control for fire pump applications

# Degree of Hazard & Methods for BFP and X-conn Control



## ▪ **YARD HYDRANTS**, with below ground weep holes:

- Publically owned/part of public water system, weep holes prohibited when accessible/intended for potable use (i.e. campgrounds)
- Owned/part of public water system, and not for potable use, or on private service connection, must install appropriate bfp assembly.

Label not for human consumption or nonpotable.

- *Recommend ASSE 1057 freeze resistant sanitary yard hydrant*

## ▪ **RWH OR GRAY WATER SYSTEMS**

- Physical separation of two systems
- Make up water line to a storage tank with air gap discharge
- RP at meter or alternately, on service line to tank.

# Components of a BFP Program



**QUALIFICATIONS FOR PROGRAM OVERSIGHT  
& TESTING OF BACKFLOW PREVENTERS**

**OEPA SANITARY SURVEY CHECKLIST USED TO  
DETERMINE ADEQUACY OF BFP PROGRAM**

# Components of a BFP Program



## QUALIFICATIONS (PROGRAM OVERSIGHT & TESTING)

### THE INDIVIDUAL:

- Overseeing the program must be the operator of record or under his/her authority
- Implementing the program should have completed a training course about backflow prevention theory and testing procedures
- Testing containment assemblies should have ODOC tester certification
- Testing isolation devices must follow ODOC requirements
- Testing backflow prevention assemblies on fire protection system may need certification from State Fire Marshal

# Components of a BFP Program



## SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

### **COMPONENTS OF A GOOD BACKFLOW PREVENTION PROGRAM:**

1. Local ordinance or other legal mechanisms in place to control cross-connections
2. Backflow preventer required is appropriate for degree of hazard
3. Backflow preventers are inspected/tested every 12 mos.
4. Discontinue service when backflow preventer not installed or properly maintained

# Components of a BFP Program



## SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

6. Minimum pressure sustaining controls maintained for booster and fire pump installations drawing from public water supply
7. Service connections with auxiliary water systems have physical separation and backflow preventer; or follow requirements of OAC 3745-95-04(C)(2)
8. Has a criteria for acceptable backflow prevention device tester
9. Backflow prevention needs for all existing customers have been identified

# Components of a BFP Program



## SANITARY SURVEY CHECKLIST TO DETERMINE ADEQUACY OF BACKFLOW PREVENTION PROGRAM

10. Mechanism in place to identify backflow prevention needs on new service connections
11. Periodic resurvey, as defined in rule, of all consumers to determine current water use practices and that adequate protection is in place
12. Backflow preventers at treatment plants and other facilities owned by water system/municipality tested every 12 mos.
13. Air gap provided at bulk water sale stations
14. Trained PWS staff in cross connection control

# Appendices



**LISTING OF STATE OF OHIO LAWS AND RULES PERTAINING  
TO BFP AND X-CONN CONTROL**

**SUGGESTED LANGUAGE FOR LOCAL ORDINANCES &  
REGULATIONS**

**PROCESS OF APPROVING BACKFLOW PREVENTERS BY RULE**

**INSPECTION, TESTING AND MAINTENANCE PROCEDURES FOR  
BACKFLOW PREVENTERS**

**OHIO EPA GUIDANCE DOCUMENTS REFERENCED IN MANUAL**



# For More Information



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See website for current draft rule and manual:

<http://epa.ohio.gov/ddagw>

Rules Link

Interested Party Review Tab

Sign up for rule notification emails:

[ohioepa.custhelp.com/ci/documents/detail/2/subscriptionpage](http://ohioepa.custhelp.com/ci/documents/detail/2/subscriptionpage)

Proposed changes expected to be filed for a second round of interested party review in January 2015 time frame.

THANK YOU!



Environmental  
Protection Agency