

The Centers for Disease Control and Prevention's Vessel Sanitation Program is proud to bring to you the following session:

Cross Connection Control

While this presentation is primarily intended for cruise vessels under the jurisdiction of the Vessel Sanitation Program it may also be used by anyone who is interested in this topic.

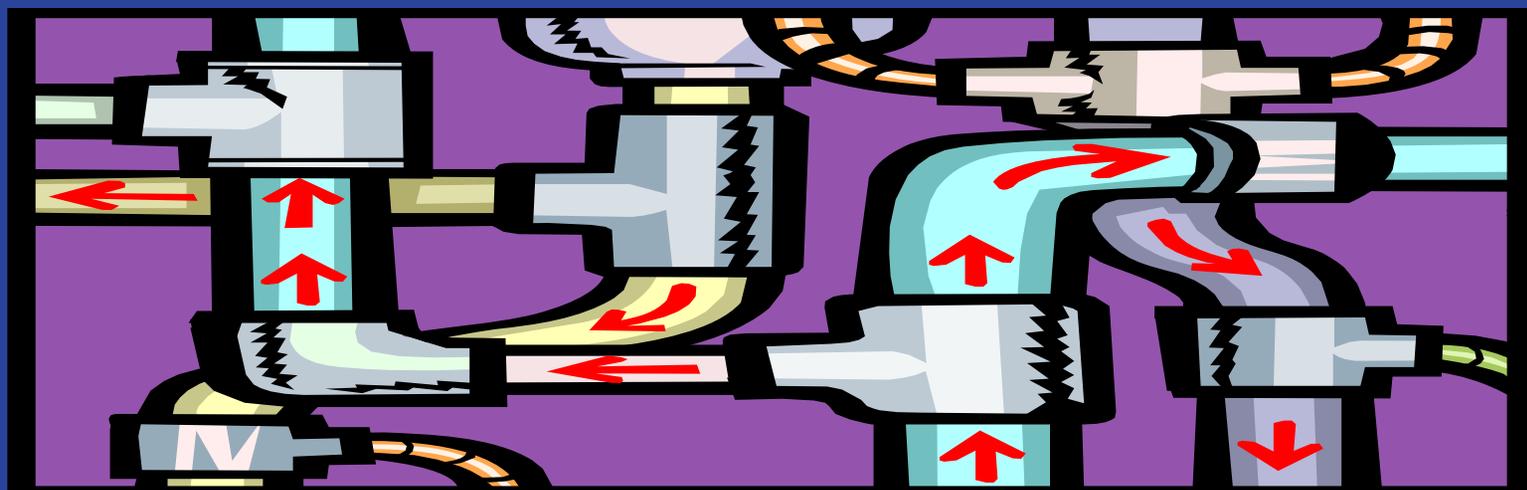
This session should not be used as a replacement for existing interactive training but should be used as an adjunct to a comprehensive training program.



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Protecting the Potable Water System on Your Vessel



Vessel Sanitation Program

2007



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Learning Objectives

- Describe the differences between backpressure and backsiphonage
- List the type of protection/devices acceptable for backpressure and backsiphonage
- List what must be considered prior to selecting the appropriate form of protection for a cross-connection
- Describe the difference between a contaminant and a pollutant

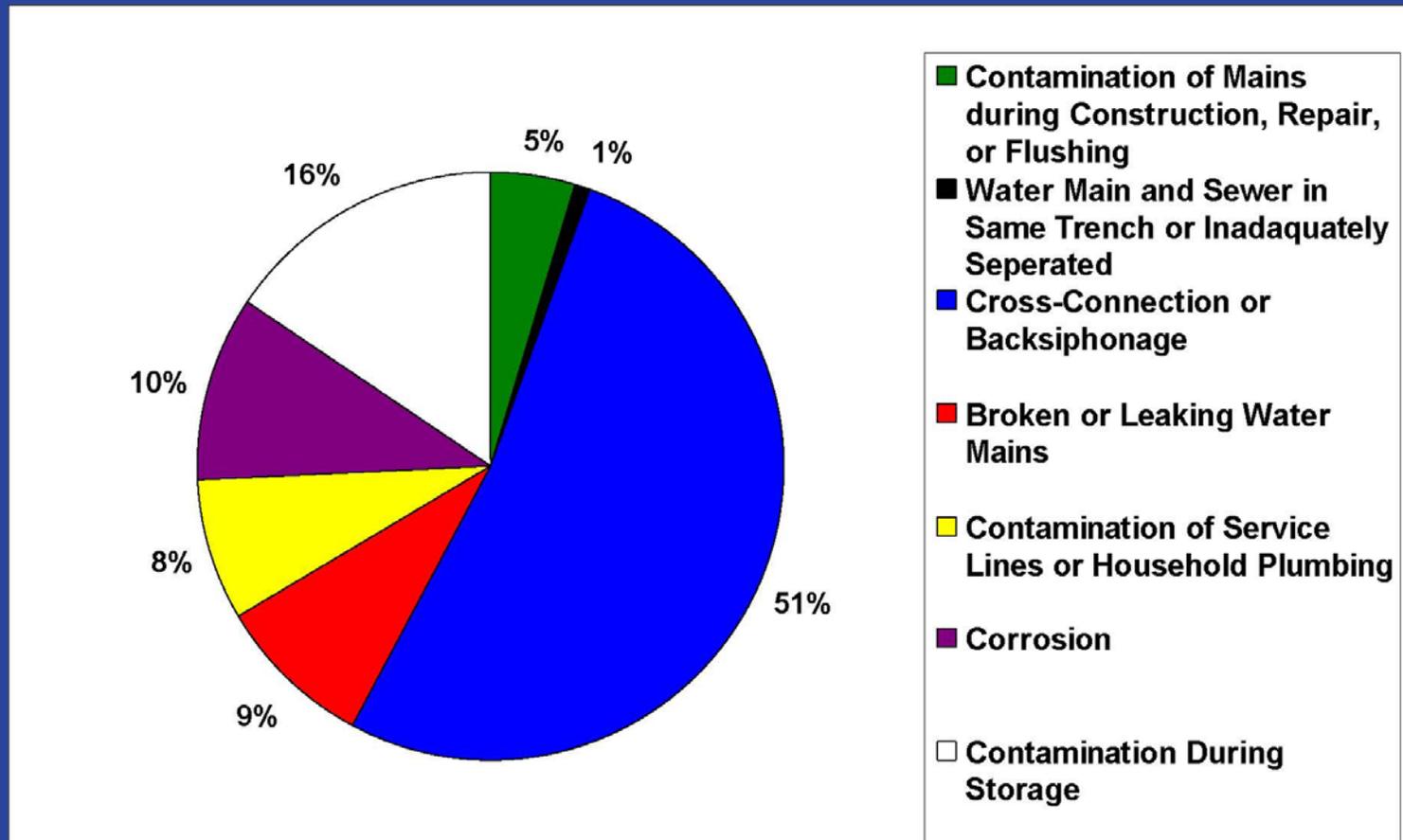


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Waterborne Outbreaks caused by Distribution System Deficiencies, 1971-2000



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Identification of Potable Water Lines and Fittings

- Paint or stripe “unique “ blue at 5 m (15 feet) intervals
 - ISO14726
- Paint on both sides of partitions, bulkheads, and decks
- No blue downstream of reduced pressure devices



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ISO 14726

COLOUR MARKING OF PIPES

PIPE MARKING LIST FOR SEA VESSELS

	Black water		Thermal fluid
	Bilge water		Lubricating oil for inter. com
	Grey water		Hydraulic fluid
	Fresh water sanitary		Steam for heating purp.
	Potable water		Exhaust steam
	Cooling fresh water		Sprinkler water
	Ballast water		Fire-fighting gas
	Cooling sea water		Natural exhaust air
	Decontamination water		Hydrogen
	Compressed air (High)		Acetylene



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Potable Water System Free or Cross-connections

Cross-connection

An actual or potential connection between a potable water supply and any non-potable substance of source.



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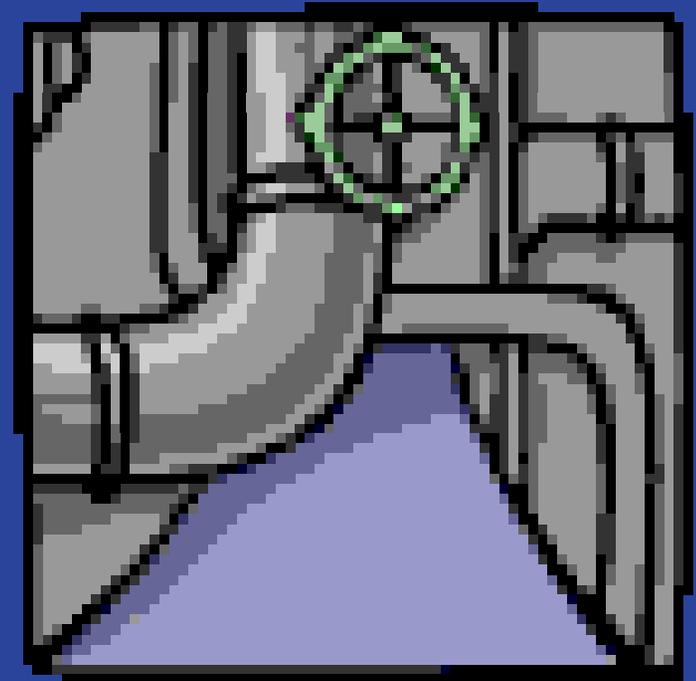


Backflow

The undesirable reversal of flow of water or other substance into the potable water distribution system.

Backsiphonage

Backpressure

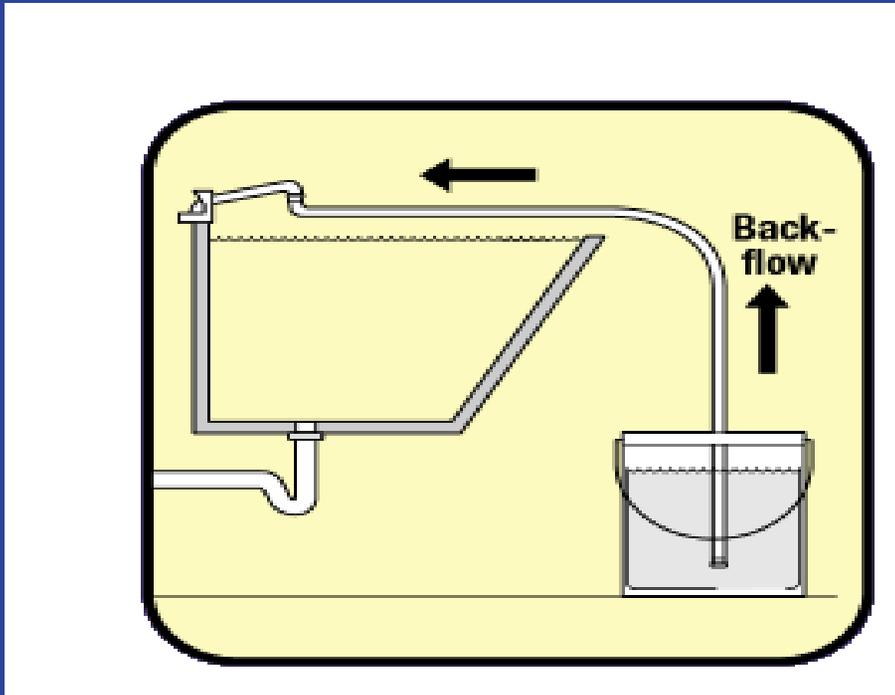


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Backsiphonage



Negative pressure in a piping system.



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Backpressure

Pressure in downstream piping greater than the supply pressure



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Types of Cross-connection

- Direct
 - Backpressure
 - Backsiphonage
- Indirect
 - Backsiphonage



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Types of Backflow Prevention

- Non-Mechanical
- Mechanical



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Air Gap (AG)-Non-Mechanical

- Air gap
 - Physical separation
 - 2 pipe diameters
 - At least 2.54 cm (254 mm)
- Highest form of protection
 - sewage



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Air gap alternatives

Barometric Loop

Or

Anti-siphon Loop



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Mechanical Device Options

- Non-continuous Pressure
- Continuous Pressure
- Health Hazard
- Non-health Hazard
- Backpressure
- Backsiphonage
- Others



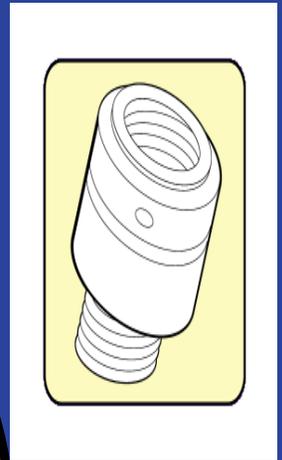
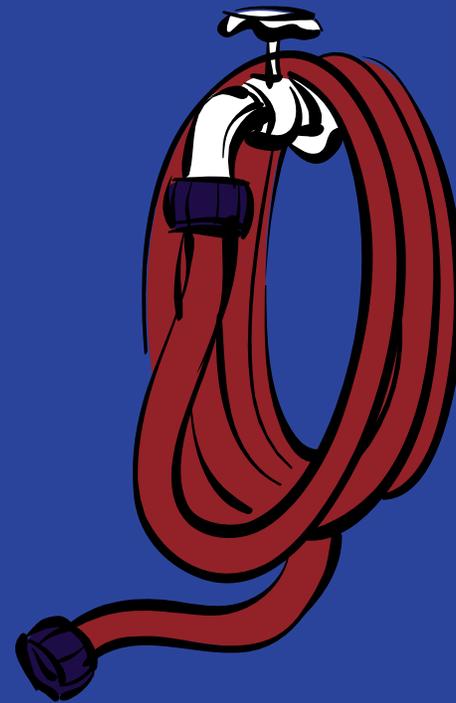
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Non-Continuous Pressure

- Hose bib backflow preventer with a single check valve
 - Can not have a valve downstream



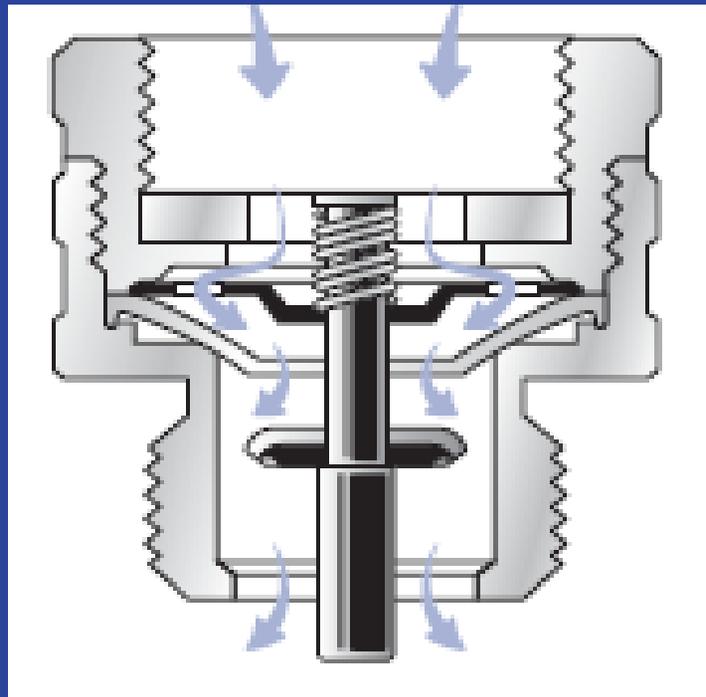
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Non-Continuous Pressure

- Vacuum Breaker



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Atmospheric Vacuum Breaker Assembly (AVB)

- Health Hazard
- Non-continuous Pressure
 <12hrs per 24 hrs
- Backsiphonage



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Continuous Pressure Type Backflow Preventers

- Double check valve
- Intermediate atmospheric vent
- Low hazard



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Pressure Vacuum Breaker Assembly (PVB)

- Continuous pressure
- Health hazard
- Backsiphonage



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Reduced Pressure Principle Assembly

- Continuous Pressure
- Health Hazard
- Backpressure
- Backsiphonage



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Testable Devices

Annual pressure testing required

- Specific test kit
- Record pressure differentials



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Comprehensive Cross-connection Control Program

Listing of all connections to the potable water system where there is a potential for backflow



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Comprehensive Cross-connection Control Program

- Connection
- Location
- Protection
 - non-mechanical (air-gaps)
 - mechanical
- Inspection record
- Testing records (RP)



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Pollutant

- Does not cause a health hazard but adversely affects the aesthetic quality of the water



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Contaminant

- Creates a health hazard to the public through poisoning or spread of disease



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Degree of Hazard versus Protection

- Pollutant
 - Coffee
 - Detergent
- Contaminant
 - Body fluids
 - Sewage
 - Toxic chemicals
- Sewage
 - Black water
 - Grey water ?



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Sewage

- Air gap only
 - Can not fail



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Class Exercise

- Go through the 4 schematics.
- Are the colors on the lines correct?
- Is protection needed?
- Is the protection provided adequate?
- What would you do to protect the potable water supply?
- Change the color on lines if needed at the end of the exercise.



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Selecting Appropriate Devices

- Degree of Hazard
- Back Pressure or Back Siphonage
- Continuous or Non-continuous
- Device Installation Requirements
 - Manufacturer
- Device Special considerations
 - Manufacturer



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Lube Oil Separator

diagram



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Mineralizer

diagram



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Sewage Tank

diagram



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Chemical Dosing Tank

Diagram



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Resources and References

- www.cdc.gov
- www.fda.gov
- www.epa.gov
- www.usc.edu



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