



# City of Santa Barbara

## Backflow Assembly Requirements

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# Responsibility of Water Supplier

The water supplier has the responsibility to maintain their public water system in compliance with all federal and state drinking water standards. Since cross-connection can cause contamination of the public water supply, water suppliers should have a cross-connection program in place.

The program should include an ordinance or rules of service to give the water supplier the authority to implement the cross-connection control program. Under the cross-connection regulations or rules of most states and territories the water supplier has the primary responsibility to prevent unapproved water sources, or any other substance, from entering the public water supply system.

The water supplier is prohibited by these regulations or rules from installing or maintaining a water service connection to a consumer's water system within its jurisdiction where a health system, plumbing or pollutional hazard exists, or will probably exist, unless the public potable water supply is protected against backflow by an approved backflow prevention assembly(s) installed at the service connection(s), i.e. point of delivery.

The water supplier's responsibility begins at the source and includes all of the public water distribution system, including the service connection and the ends at the point of delivery to the consumer's water system(s). In addition, the water supplier must exercise reasonable vigilance to ensure that the consumer has taken the proper steps to protect the public potable water system.

To ensure that the proper precautions are taken the water supplier is required to determine the degree of hazard to the public potable water system. When it is determined that a backflow prevention assembly is required for the protection of the public system the water supplier shall require the consumer, at the consumer's expense, to install an approved backflow prevention assembly at each service connection, to test immediately upon installation, relocation and annually or more often, to properly repair and maintain such assembly or assemblies and to keep adequate records of each field test and subsequent maintenance and repair, including materials or replacement parts.

# Cross Connection Program

## (Summary of Title 17 Code of Regulations Division 1, Chapter 5, Group 4, Article 1)

### §7584. Responsibility and scope of program.

The water supplier shall protect the public water supply from contamination by implementation of a cross-connection control program. The program, or any portion thereof, may be implemented directly by the water supplier or by means of a contract with the local health agency, or with another agency approved by the health agency. The water supplier's cross-connection control program shall for the purpose of addressing the requirements of Sections §7585 through §7605 include, but not be limited to, the following elements:

- (a) The adoption of operating rules or ordinances to implement the cross-connection program,
- (b) The conducting of surveys to identify water user premises where cross-connections are likely to occur,
- (c) The provision of backflow protection by the water user at the user's connection or within the user's premises or both,
- (d) The provision of at least one person trained in cross-connection control to carry out the cross-connection program,
- (e) The establishment of a procedure or system for testing backflow preventers, and
- (f) The maintenance of records of locations, test and repairs of backflow preventers.

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### Common Commercial Hazards: (Examples only)

Irrigation	Fire Line
Mixed- Use	Fire Sprinkler
3+ Story buildings/Elevation	Boilers

### Common Residential Hazards: (Examples only)

Irrigation	Fire Sprinkler
3+ Story bldg /Elevated lots	Water Softener
Solar Water Heater	Pools/Spas/Ornamental Fountains

References: International Association of Plumbing and Mechanical Officials, "Uniform Plumbing Code", 26<sup>th</sup> Edition, International Association of Plumbing and Mechanical Officials, 2012 Chapter 6 section §603

# Backflow Prevention Assembly

## Most Frequently Asked Questions:

### Q. What is a backflow?

A. Backflow is back-pressure and/or back-siphonage;

Back-Pressure: Any elevation of pressure in downstream piping system by that could cause reversal of flow – i.e. pump, elevation, and steam or air pressure.

Back-Siphonage: A form of backflow due to a reduction in system pressure, which causes sub-atmospheric pressure to exist in the water system – i.e. water main break, damaged fire hydrant, meter shut off.

### Q. What is a cross-connection?

A. A cross-connection is a direct or indirect arrangement of piping that allows the potable water supply to be connected to a contaminated source.

**For example: water service supplying water to a building that also serves the irrigation system. Most common cross-connection is a garden hose submerged, or attached to contaminated fluids and undesirable substances.**

### Q. What is a Backflow Prevention Assembly?

A. A Backflow Prevention Assembly is a plumbing device that is most commonly installed between the water meter and the service main to the property.

### Q. Why are they installed?

A. They are installed to protect the public & private drinking water supplies from cross-connections. These are plumbing requirements at the Federal, State and Local jurisdictions.

### Q. What does a backflow preventer do?

A. Properly functioning backflow preventer only allows water to flow in one direction.

**For example: The direction of flow would be through the water meter to the property. Never allowing the water to reverse back through the water meter, into public drinking water supply.**

### Q. Where is the backflow preventer located?

A. The preventer is normally located as close as practical to the service connection from your water supply. Commonly found behind the water meter.

### Q. Why does a backflow preventer have to be tested?

A. The backflow preventer is a mechanical device with internal components such as check valves, seals, springs and rubber materials. These parts are subject to wear, fatigue and fouling. This is why backflow preventers are tested annually to ensure that they are functioning properly.

### Q. How often do the backflow preventers need to be tested?

A. Title 17 of the California Health & Safety Code states that backflow preventers must be tested annually.

### Q. What happens if the backflow preventer fails the initial test?

A. Repairs are necessary to pass the backflow preventer. In most cases, simply a cleaning and service corrects the problem. Repair parts are available if needed. Retest is performed to ensure the repairs have corrected the problem, and pass the backflow preventer.

# **Santa Barbara Municipal Code Chapter 14.20**

## **WATER REGULATIONS**

### **14.20.120 Check Valves and Anti-Backflow Devices.**

Whenever the Director shall consider it necessary for the safety of the water system to have an approved check valve or anti-backflow device placed on the property side of any consumer's service, such device shall thereupon be immediately installed at the expense of such consumer. If such device is not installed within ten (10) days after the Director shall order such installation, it shall be installed by the Public Works Department at such consumer's expense on the basis of cost, plus overhead. (Ord. 2931 §2(part), 1963; prior Code §44.48.)

## **Title 17 §7605 California Code of Regulations**

### **TESTING AND MAINTENANCE OF BACKFLOW PREVENTERS.**

- (a) The water supplier shall assure that adequate maintenance and periodic testing are provided by the water user to ensure their proper operation.
- (b) Backflow preventers shall be tested by persons who have demonstrated their competency in testing of these devices to the water supplier or health agency.
- (c) Backflow preventers shall be tested at least annually or more frequently if determined to be necessary by the health agency or water supplier. When devices are found to be defective, they shall be repaired or replaced in accordance with the provisions of this Chapter.
- (d) Backflow preventers shall be tested immediately after they are installed, relocated or repaired and not placed in service unless they are functioning as required.
- (e) The water supplier shall notify the water user when testing of backflow preventers is needed. The notice shall contain the date when the test must be completed.
- (f) Reports of testing and maintenance shall be maintained by the water supplier for a minimum of three years.

## **Uniform Plumbing Code 2012**

### **§603.4 WATER SUPPLY AND DISTRIBUTION – GENERAL REQUIREMENTS.**

Assemblies shall comply with listed standards and be acceptable to the Authority Having Jurisdiction, with jurisdiction over the selection and installation of backflow prevention assemblies.

The Premise owner or responsible person shall have the backflow prevention assembly tested by a certified backflow assembly tester at the time of installation, repair, or relocation and not less than on an annual schedule thereafter, or more often where required by the Authority Having Jurisdiction.

References: International Association of Plumbing and Mechanical Officials, "Uniform Plumbing Code", 26<sup>th</sup> Edition, International Association of Plumbing and Mechanical Officials, 2012, Chapter 6, §603.4

# BACKFLOW PREVENTION ASSEMBLIES

## Types of Hazards & Protection

Type of Protection	Non-Health Hazard (Pollutant)		Health Hazard (Contaminant)		Lethal Hazard (Sewage)	
	Back-Siphonage	Back-Pressure	Back-Siphonage	Back-Pressure	Back-Siphonage	Back-Pressure
Devices & Assemblies						
Air Gap	X	X	X	X	X	X
Reduced Pressure Principal	X	X	X	X		
Double Check	X	X				
Pressure Vacuum Breakers	X		X			
Spill-Resistant Vacuum Breakers	X		X			
Atmospheric Vacuum Breakers	X		X			

References: International Association of Plumbing and Mechanical Officials, "Uniform Plumbing Code", 26<sup>th</sup> Edition, International Association of Plumbing and Mechanical Officials, 2012 Chapter 6, Table 603.2.

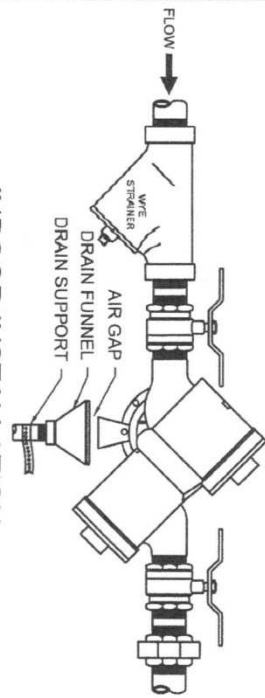
### Definitions:

- ✓ **Pollutant:** any hazard that affects aesthetics of water – taste, odor, color, smell but will not make you sick – i.e. stale water, beer, sugar, coffee, salty water, baptismal fountains.
- ✓ **Contaminant:** any hazard that could cause illness or death – i.e. chemical, pesticide, biohazard, gasoline, excessive nitrate, carbonated copper (potential toxic byproduct from soda machine backflow).
- ✓ **Back-Pressure:** Any elevation of pressure in downstream piping system by that could cause reversal of flow – i.e. pump, elevation, and steam or air pressure.
- ✓ **Back-Siphonage:** A form of backflow due to a reduction in system pressure, which causes sub-atmospheric pressure to exist in the water system – i.e. water main break, damaged fire hydrant, meter shut off.

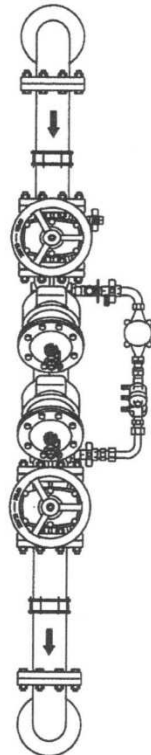


**REDUCED PRESSURE PRINCIPLE ASSEMBLY  
BACKFLOW PREVENTION ASSEMBLY (TYPE 1)**

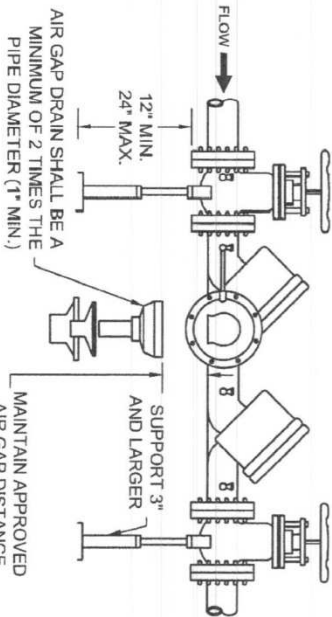
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FACILITIES:	QNTY ENGINEER	
WATER RESOURCES:	PUBLIC WORKS DIRECTOR	



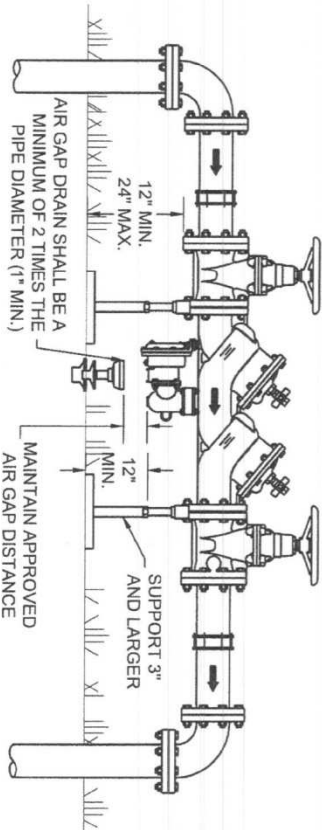
**INDOOR INSTALLATION  
TOP VIEW**



**INDOOR/OUTDOOR INSTALLATION WITH DETECTOR  
TOP VIEW**



**OUTDOOR INSTALLATION  
TOP VIEW**



**INDOOR/OUTDOOR INSTALLATION WITH DETECTOR  
SIDE VIEW**

### NOTES:

Proper installation of the assembly is essential to the protection of the water supply. The following are important characteristics of a proper installation.

1. The assembly shall be installed in a horizontal position with a minimum clearance of 18 inches and maximum of 36 inches between the relief valve discharge port and floor or grade, and a minimum of 18 inches of horizontal clearance around the unit for access and ease of testing and maintenance of the relief valve.
2. A Reduced Pressure Assembly shall not be installed in a pit. Flooding of the pit can result in cross connection contamination.
3. Placement of the assembly should be planned where water discharged from the relief port will not be objectionable.
4. The assembly must be purchased and installed with resilient seat valves as approved by the University of California Foundation for Cross-Connection Control and Hydraulic Research (USC).  
**CAUTION:** Open and close resilient seated shut-offs slowly to prevent water hammer damage to the system and assembly.
5. Since the reduced pressure assembly is designed to be serviced while in line, the unit need not be removed from the line during servicing. Union connections between the shut-off valves are recommended for ease of removal for damaged units 2 inch and smaller.
6. Ensure the supply water pressure does not exceed the manufacturer's maximum water pressure rating of the assembly to avoid damage to the system or the assembly caused by system pressure. In addition, protection must be provided against thermal water expansion, extreme backpressure and/or water hammer.
7. Most field problems occur because dirt or debris present in the system at the time of installation becomes trapped in the first check seating area, resulting in continuous discharge from the relief valve in a static or backflow condition. **THE SYSTEM SHOULD BE FLUSHED BEFORE THE ASSEMBLY IS INSTALLED.** If debris is in the water system continues to cause fouling, a strainer can be installed upstream of the assembly.
8. Backflow assembly shall be lead free.



### REDUCED PRESSURE PRINCIPLE ASSEMBLY BACKFLOW PREVENTION ASSEMBLY (TYPE 1) NOTES

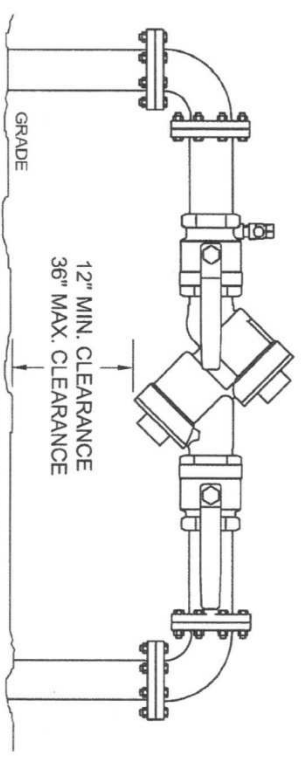
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		PUBLIC WORKS DIRECTOR	



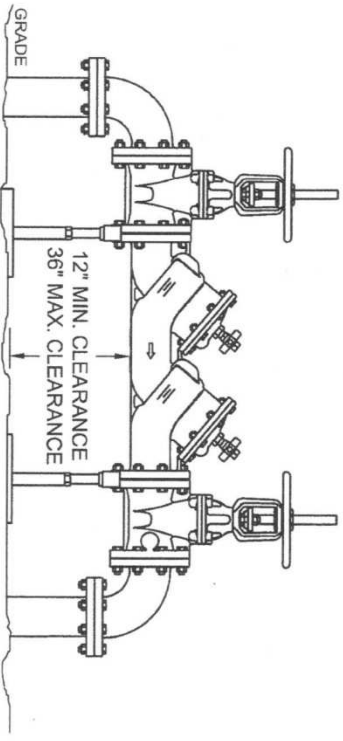


**DOUBLE DETECTOR CHECK ASSEMBLY  
BACKFLOW PREVENTION ASSEMBLY (TYPE 2)**

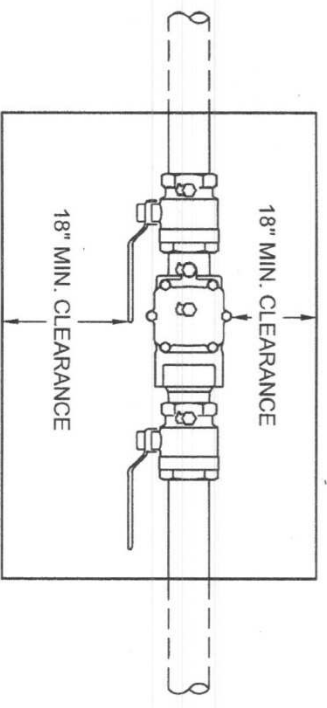
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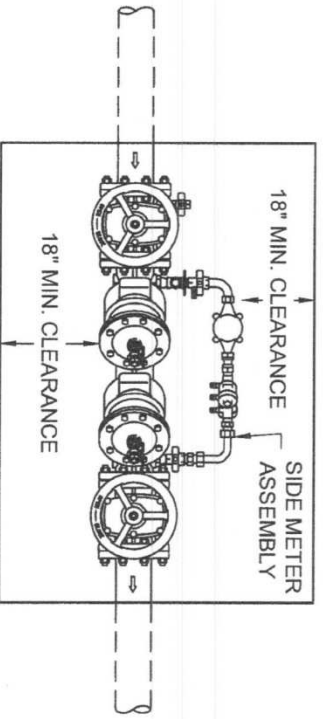
**DOUBLE CHECK VALVE ASSEMBLY  
(SIDE VIEW)  
(SIZES 3/4" THROUGH 2")**



**DOUBLE CHECK DETECTOR CHECK ASSEMBLY  
(SIDE VIEW)  
(SIZES 2-1/2" AND LARGER)**



**PIT INSTALLATION  
(TOP VIEW)  
(SIZES 3/4" THROUGH 2")**



**PIT INSTALLATION  
(TOP VIEW)  
(SIZES 2-1/2" AND LARGER)**

**NOTES:**

1. The Double Check Valve Assembly must be installed where it is accessible for periodic testing and maintenance.
2. **PRIOR TO INSTALLING IN LINE, FLUSH SUPPLY LINE OF ALL FOREIGN MATERIAL.** Failure to flush the lines completely may cause the checks to become fouled and require disassembly and cleaning.
3. The device shall only be installed per manufacturer's specifications.
4. When threading the device in line, place wrench only on ball valve hex ends. Keep pipe dope off interior surfaces of valve. On 2-1/2-inch and larger devices, **DO NOT LIFT THE DEVICE WITH GATE VALVE HANDWHEELS OR STEMS. ALSO DO NOT SUPPORT DEVICE FROM ONLY ONE END.**
5. After installation, fill device and bleed air from unit. Test to ensure proper operation. If either check fails to hold 1.0 PSI, it is most likely due to fouling. The cap must be removed and the seat and/or seat disc cleaned.
6. The device must be protected from freezing. Thermal water expansion and/or water hammer downstream of the backflow preventer can cause excessive pressure increases. Excessive pressure situations should be eliminated to avoid possible damage to the system and device.
7. All potable dedicated fire lines will be required to have double check detector check.
8. Any backflow prevention assembly installed overhead (5' or more) must have a permanent platform built for accessibility.
9. Refer to Uniform Plumbing Code (UPC) chapter 6, sections 603.00 thru 603.4.20 for more information.



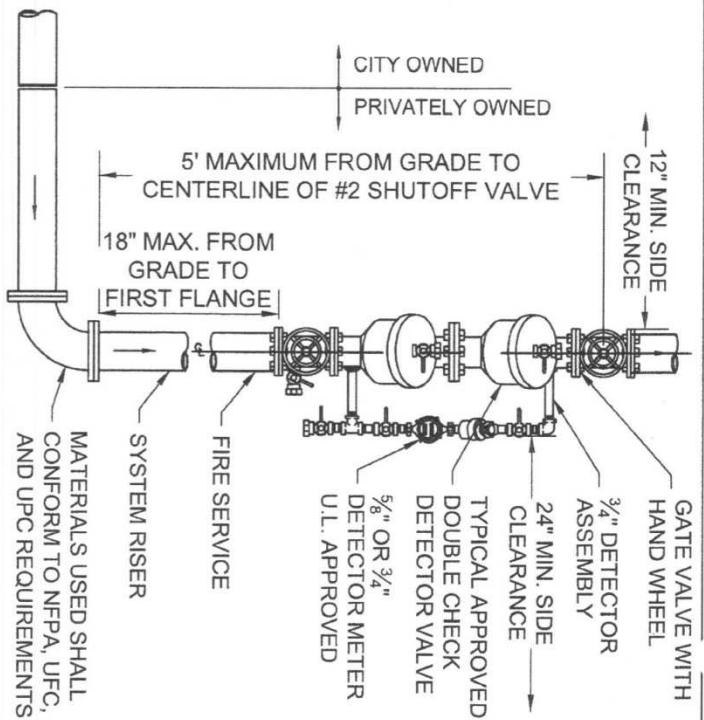
**DOUBLE DETECTOR CHECK ASSEMBLY**  
**BACKFLOW PREVENTION ASSEMBLY (TYPE 2) NOTES**

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FACILITIES:	WATER RESOURCES:	APPROVED: <i>[Signature]</i>	CITY ENGINEER
		<i>[Signature]</i>	PUBLIC WORKS DIRECTOR

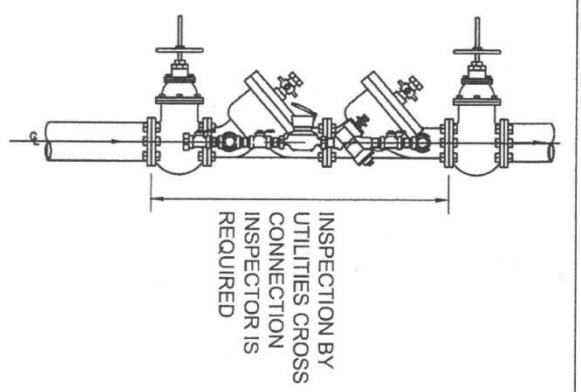


**DOUBLE DETECTOR CHECK ASSEMBLY  
VERTICAL INSTALLATION**

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TRANS. OFs:	APPROVED: <i>[Signature]</i>	
FACILITIES:	ONLY ENGINEER	
WATER RESOURCES:	<i>[Signature]</i>	PUBLIC WORKS DIRECTOR



**ELEVATION**



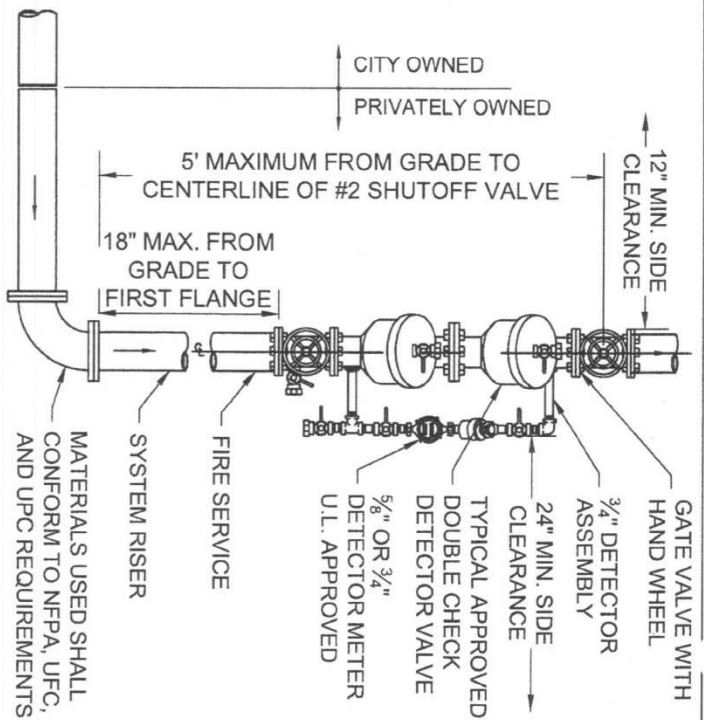
**SIDE VIEW**

- NOTES:**
1. Assembly and installation shall conform to Standard Detail W-13.0.
  2. Double check detector required on all potable dedicated firelines.
  3. Side clearance shall be 12" minimum from back of backflow device to any wall or other obstruction.
  4. Clearance from detector side of backflow assembly shall be a minimum of 24" from all obstructions.
  5. Assembly must be installed as a unit.
  6. Distance from grade to centerline of the #2 shut off valve shall be a maximum of 5 feet.
  7. Minimum of 18" from grade to first flange of #1 shut off valve.
  8. Assembly must be an approved assembly from USC list or equivalent.

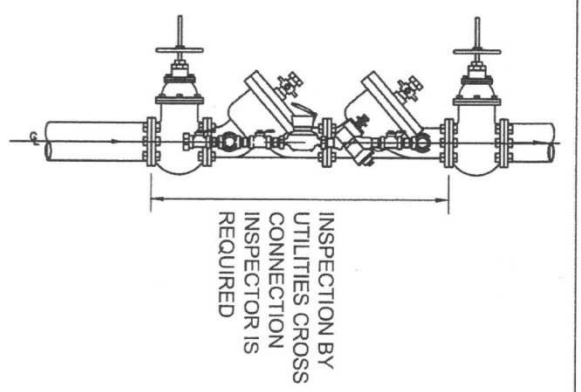


**DOUBLE DETECTOR CHECK ASSEMBLY  
VERTICAL INSTALLATION**

STREETS:	REV. DATE: 11/12	DETAIL: W-13.2
TRANS. OPs:	APPROVED: <i>[Signature]</i>	
FACILITIES:	ONLY ENGINEER	
WATER RESOURCES:	<i>[Signature]</i>	
	PUBLIC WORKS DIRECTOR	

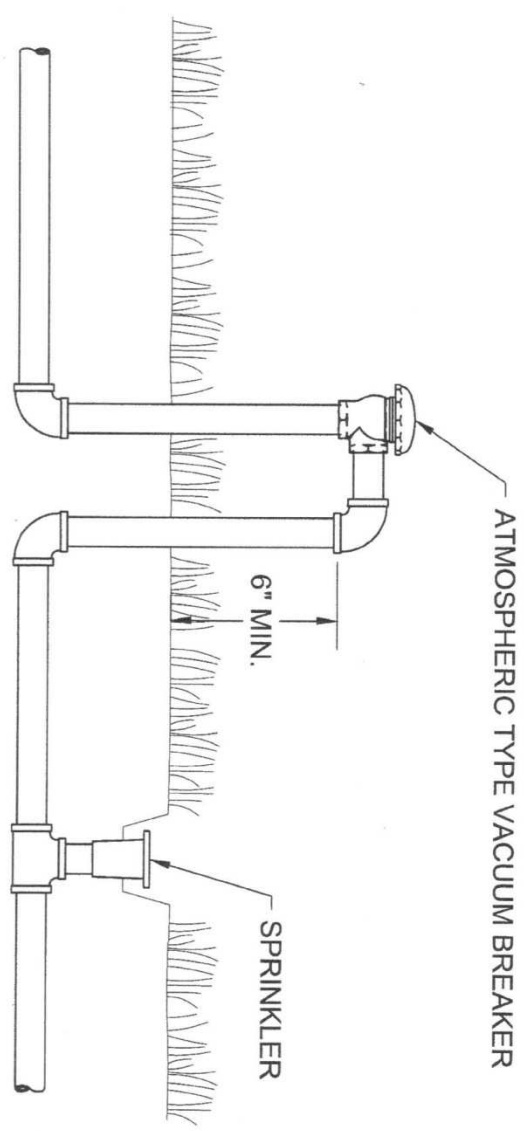


**ELEVATION**



**SIDE VIEW**

- NOTES:**
1. Assembly and installation shall conform to Standard Detail W-13.0.
  2. Double check detector required on all potable dedicated firelines.
  3. Side clearance shall be 12" minimum from back of backflow device to any wall or other obstruction.
  4. Clearance from detector side of backflow assembly shall be a minimum of 24" from all obstructions.
  5. Assembly must be installed as a unit.
  6. Distance from grade to centerline of the #2 shut off valve shall be a maximum of 5 feet.
  7. Minimum of 18" from grade to first flange of #1 shut off valve.
  8. Assembly must be an approved assembly from USC list or equivalent.



PLAN VIEW

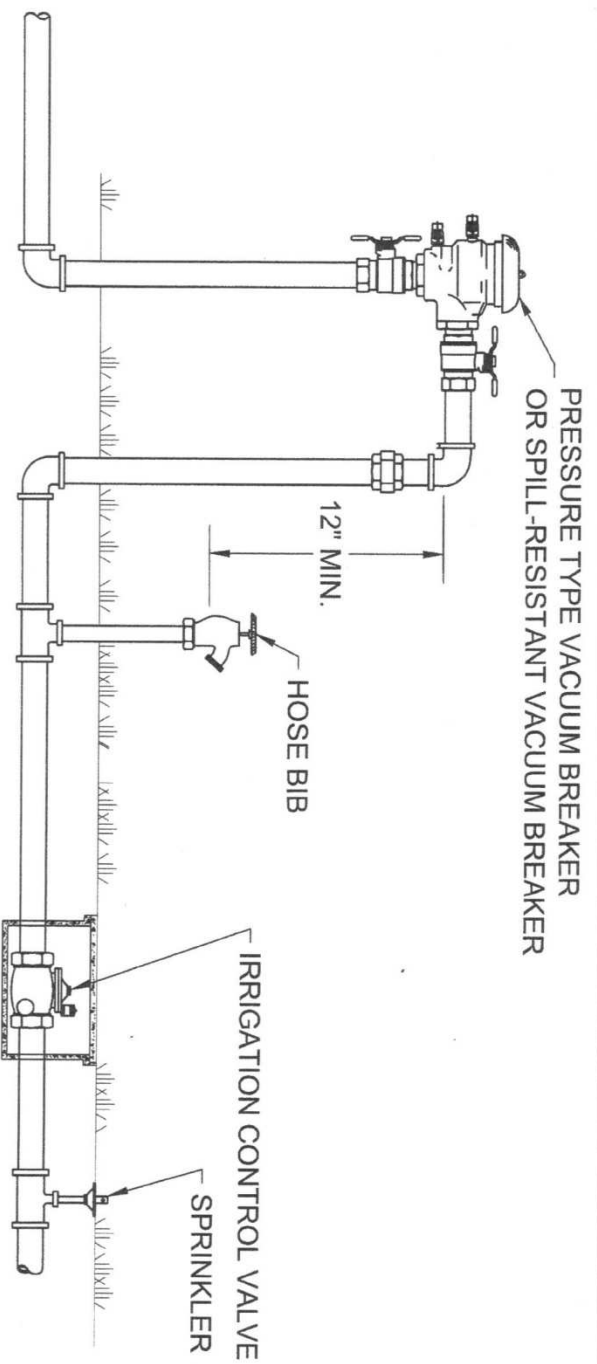
**NOTES:**

1. Downstream side of atmospheric type vacuum breaker (AVB) shall not contain any means of shut off.
2. AVB's shall not be subject to any backpressure.
3. AVB's are for intermittent use only and shall not be pressurized for more than 12 hours in any 24 hour period.
4. AVB's shall not be installed where occasional dusty or corrosive conditions occur.
5. AVB's shall be installed a minimum of 6 inches above the highest downstream piping and/or outlets.
6. AVB's shall always be installed above the 100 year flood level unless otherwise approved by Engineer or designee.



# ATMOSPHERIC TYPE VACUUM BREAKER

STREETS: TRANS OPS: FACILITIES: WATER RESOURCES:	REV. DATE: 11/12    DETAIL: W-17.0 APPROVED: <i>[Signature]</i> CIVIL ENGINEER <i>[Signature]</i> PUBLIC WORKS DIRECTOR
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PLAN VIEW

**NOTES:**

1. Downstream side of pressure type vacuum breaker may be maintained under pressure by a valve, but any backpressure by pump or other means is strictly prohibited.
2. PVB's (Pressure Vacuum Breakers) and SVB's (Spill-Resistant Vacuum Breakers) are designed to protect against back siphonage only; not backpressure.
3. PVB's and SVB's shall be installed where occasional water discharge caused by pressure fluctuations is acceptable.
4. PVB's and SVB's shall be installed a minimum of 12 inches above the highest downstream piping and/or outlets.
5. PVB's and SVB's shall always be installed above the 100 year flood level unless otherwise approved by Engineer or designee.
6. Provide minimum clearances for testing and repair.



# PRESSURE TYPE VACUUM BREAKER

STREETS: TRANS. OPS: FACILITIES: WATER RESOURCES:	REV. DATE: 11/12    DETAIL: W-16.0 APPROVED: <i>[Signature]</i> CITY ENGINEER <i>[Signature]</i> PUBLIC WORKS DIRECTOR
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**CITY OF SANTA BARBARA PUBLIC WORKS  
RESIDENTIAL FIRE SPRINKLER SYSTEMS POLICY**

The following represents water meter and fire line options available for residential fire sprinkler systems.

**METERED OPTIONS**

<u>FLOW REQUIRED</u>	<u>SERVICE SIZE</u>	<u>METER SIZE</u>	<u>COST</u>	<u>BY-IN REQ.</u>
Up to 20 GPM	1 in.	5/8 in	Per Resolution	Yes
>20 up to 50 GPM	1 in	1 in	Per Resolution	Yes
>50 up to 160 GPM	2 in	2 in	Per Resolution	Yes

All residential services used for fire sprinkler supply shall have as a minimum, an approved double check valve backflow assembly. The backflow assembly shall be placed at the meter or a location approved by the City’s Cross-Connection Specialist. There is no exception to the backflow requirement.

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There may be situations where the flow requirement, available flow capacity, or unfavorable hydraulic conditions require a service that is dedicated to providing the flow to the fire sprinkler system. In such cases, a domestic meter of appropriate size is purchased along with the dedicated fire line listed below.

**DEDICATED FIRE LINE OPTION**

<u>FLOW REQUIRED</u>	<u>SERVICE SIZE</u>	<u>METER SIZE</u>	<u>COST</u>	<u>BY-IN REQ.</u>
Up to 160 GPM	2 in.	N/A	Per Resolution	No

All dedicated fire lines shall have, as a minimum; a City of Santa Barbara approved double check detector backflow assembly with a manufacture installed flow detection meter. The backflow assembly shall be placed at the curb above or below ground, per City of Santa Barbara Standards or a location approved by the City’s Cross-Connection Specialist. There is no exception to the backflow requirement.

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**CONTACTS:**

Matt Ward	Water Distribution Superintendent	564-5414
Jose “Pep” Marquez	Water Distribution Supervisor	564-5409
Jim Jenkins	Water Distribution Supervisor	564-5413
Peggy Avila	Cross-Connection Control Specialist	564-5575
Maggi Walker	Water Reclamation Specialist	564-5406

## **Santa Barbara Municipal Code 14.12**

### **PRIVATE FIRE SERVICE**

- 14.12.010 Private Fire Service - Non-Meter Rates.**
- 14.12.020 Private Fire Service - When Line to be Metered, Etc.**
- 14.12.030 Private Fire Service - Reservation of Right to Disconnect.**
- 14.12.010 Private Fire Service - Non-Meter Rates.**

The rate for City water for private fire services when the use of a meter is not required shall be set by resolution of the City Council. (Ord. 3829, 1976.)

#### **14.12.020 Private Fire Service - When Line to be Metered, Etc.**

If an existing fire service line is found tapped for domestic use, a meter or detector-check device shall be installed on such service at the expense of the consumer and the regular meter rate shall be charged thereafter in addition to the fire service rate. All fire service lines installed after the effective date of the ordinance codified in this chapter shall have an approved detector-check and by-pass meter installed and such device shall be considered part of the fire service cost. (Ord. 2931 §2(part), 1963; prior Code §44.21.)

#### **14.12.030 Private Fire Service - Reservation of Right to Disconnect.**

The right shall be reserved to disconnect fire service lines from the City main by direction of the Council on recommendation of the Director of the Public Works Department. (Ord. 2931 §2(part), 1963; prior Code §44.22.)



## **Contact Information:**

Mailing Address:  
City of Santa Barbara  
Cross-Connection Control Office  
P.O. Box 1990  
Santa Barbara CA 93102-1990

Physical Address:  
625 Laguna Street

FAX – (805) 564-5561

### **Please send all test reports to:**

*Cross-Connection Administrative Specialist:*  
Neville Smeda (805) 897-2572  
NSmeda@SantaBarbaraCA.gov

### **For Technical questions please contact:**

*Cross-Connection Specialist:*  
Peggy Avila (805) 564-5575  
PAvila@SantaBarbaraCA.gov

*Water Reclamation Assistant:*  
Maggi Walker (805) 564-5406  
MWalker@SantaBarbaraCA.gov