

CROSSTALK

Autumn 2016

RESULTS OF INSTALLING A BACKFLOW PREVENTION ASSEMBLY



It is not unusual to find a backflow prevention assembly installed at the service connection of a school, business or factory. In many cases the water supplier requires an assembly to be installed at the service connection to protect the integrity of the potable water system. However, when installing an assembly for system protection at the service connection of a property it does create, essentially, a closed system. The system inside the property no longer can release any excess pressure due to thermal expansion or water hammer.

Technically, a closed system is a system which cannot exchange matter with an outside system; although energy may be exchanged, which allows a system to heat up because of outside forces. Before adding an assembly at the service connection, increased pressure on the property could be dissipated through the distribution system. But, when creating a closed system by adding an assembly at the service connection, there is no place for the increased pressure to dissipate. Therefore, the pressure increases.

For example, a property has a boiler room. Pipes in the boiler room get rather hot and, in effect, cause the pressure of water to increase. If there is no assembly at the service connection to the property, the increased pressure of water would move back out through the service connection and dissipate in the water distribution system. If an assembly is installed, the increased temperature causes the volume of the water to increase, but with nowhere

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New Members

Below is a list of those who have become members of the USC Foundation since the last *Cross Talk*.

ABCO

Gustavo Guterrez

K Hayes Limited

Plumbers & Steamfitters JATC Local 166

Savannah Backflow Specialist

Thomas Hsu

Western Fire Protection, Inc.

AVAILABLE NOW Webinars on Demand

Grey Water and

Recycled Water Shutdown Test

Different Facilities;

Different Cross-Connections

How the Use of Equipment Results
in Cross-Connections

Cross-Connection Control Surveys

Assembly Repair and Lead Free Issues

fccchr.usc.edu/ondemand

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Demand **6**

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Safe Water on You Tube **7**




2017 USC List Book Available
in January **7**

USC Foundation Membership Benefits









Hahn Plaza clock

Membership Discounts

-  **MORE THAN 25%** OFF Manual Orders
-  **MORE THAN 25%** OFF Training Courses
-  **35-65%** OFF Seminars & Webinars

Additional Benefits

-  *Cross Talk* quarterly subscription
-  Up to 3 complimentary *Webinars* or *Webinars on Demand*
-  Free copy of each new edition of the *Manual of Cross-Connection Control*
-  2017 *USC List of Approved Backflow Prevention Assemblies* book (At member's request)
-  Email notifications of new updates to the *USC List of Approved Backflow Prevention Assemblies*
-  *Special Notices* mailed exclusively to members as published

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a Division of the University of Southern California

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USC FOUNDATION ENDOWMENTS

The USC Foundation for Cross-Connection Control and Hydraulic Research was established by the USC Board of Trustees in 1944. Though the Foundation is not an academic department it shares the University's objectives of education, research and service to the community. For more than 70 years the Foundation has conducted research in cross-connection control, developed standards for backflow prevention assemblies, established field testing procedures for those assemblies and has made available training tools to those involved in protecting potable water supplies. And, like other aspects of the University, the Foundation relies on the support of its members and supporters in order to maintain its strong leadership in backflow prevention and cross-connection control.



Over the years the Foundation has received generous gifts from members and organizations. For example, the Foundation was established when a group of concerned individuals presented the University with a gift to fund a

research program to investigate cross-connections in potable distribution systems.

In 1967, the Southern California Water Utilities Association (SCWUA), recognizing the benefit of the Foundation's work to the association's members, donated \$10,000 (adjusting for inflation, that is approximately \$72,000 today) to establish the Foundation's Membership program. Today, the program is made up of individuals, companies, state agencies, federal agencies and water purveyors. And, since the Foundation is a self-funded division of the University, the support from the Membership program helps fund the day-to-day operations, provides partial funding for research projects and helps develop training tools for those involved in backflow prevention or cross-connection control.

Al Jorgensen, a member of the Board of Advisors of the Foundation, who helped guide the work of the Foundation for five decades made arrangements for a gift to be made to the Foundation after his passing in 2014. Al's passion for protecting potable water supplies for most of his adult life contributed to his decision to set up a gift to the Foundation. These funds have been used to setup an endowment at the University to be used for



Al Jorgensen

student scholarships. As an endowment the original funds will never be used. Only interest received on these funds will be used as grants or scholarships to USC Engineering students. This ensures that Al's wish to continue supporting education will live on and help the Foundation and the University achieve one of their most important objectives.

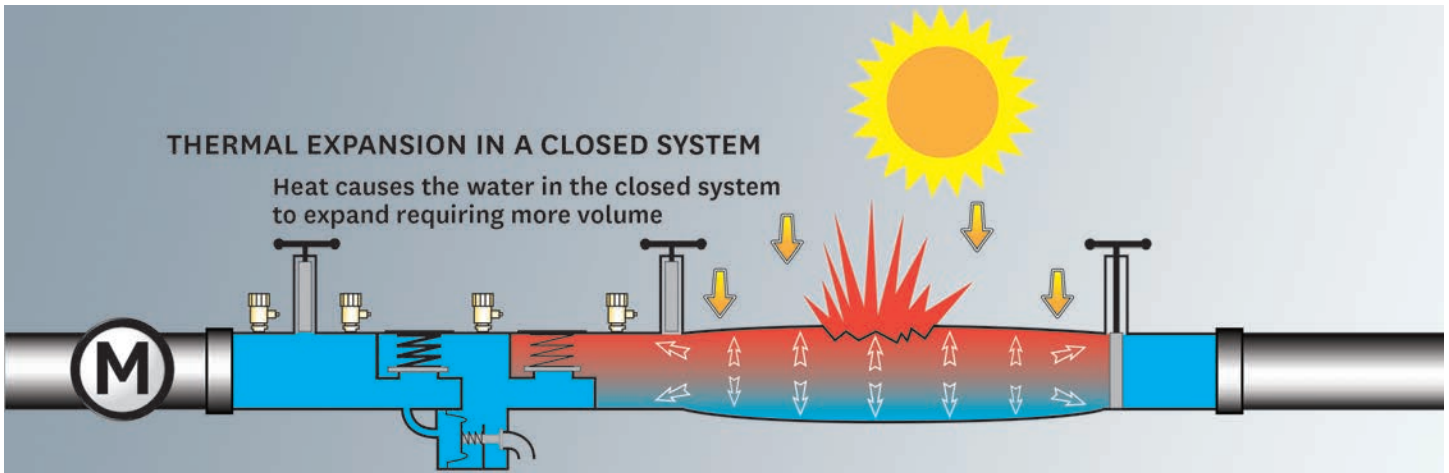
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results of installing a backflow prevention assembly : continued

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for the increased volume to go, the pressure increases instead. But, there is no place for this pressure to dissipate. Thermal expansion causes an increase in pressure within the pipes. The pressure increases until something relieves the pressure. Either water is used

through a pipe is stopped quickly. This may occur when a solenoid valve, or even a quarter turn ball valve is closed too quickly. The flowing water is stopped when it hits the closed valve, but a shock wave is sent back in the opposite direction.

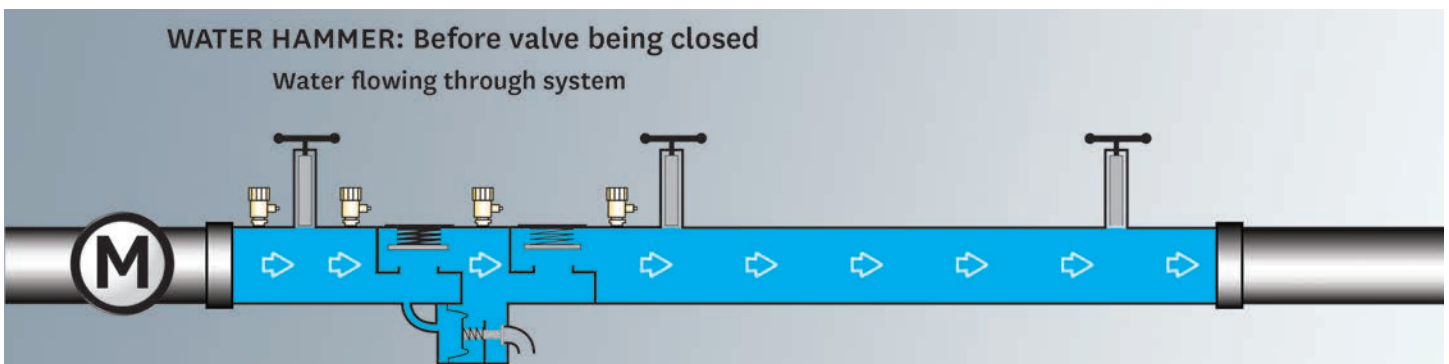


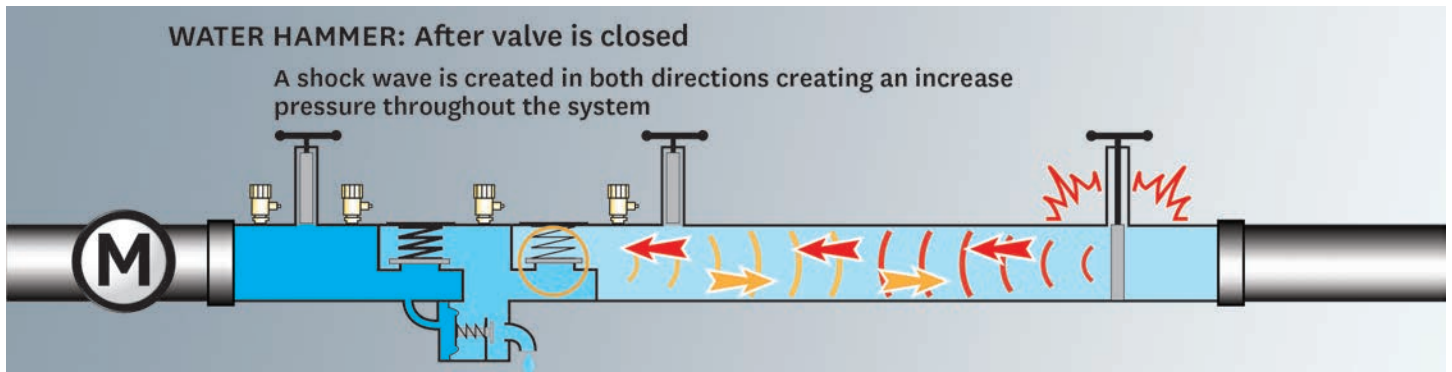
somewhere in the system which drops the pressure or a pipe or fixture breaks, relieving the pressure.

Since adding the assembly no longer allows pressure to dissipate into the distribution system, the customer may look at the assembly as the cause of the problem. Although the assembly itself is not the cause of the problem; the installation of the assembly does prevent the water from being released through the service connection, thus increasing the pressure.

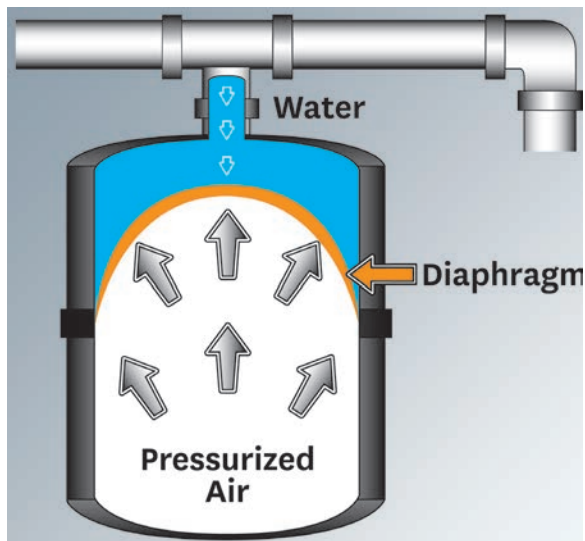
Another phenomenon that may occur in a hydraulic system is a water hammer. A water hammer occurs when the flow of water

The water hammer, or shock wave, would dissipate if the system was an open system. However, in a system which is closed because of an assembly, the shock wave would hit the downstream check valve of the assembly and the wave would “bounce” back through the system. This may increase the pressure throughout the system up to several times the normal water pressure. This maybe enough to cause significant damage to equipment and water fixtures. In a physical model, water flowing at 15 feet per second through pipe generated an increase in pressure of over 900 pounds per square inch (psi), when a downstream valve was closed instantaneously.





To prevent damage to a water system, an expansion tank may be installed to alleviate the pressure build up due to thermal expansion and may reduce the force of a shock wave from water hammer. An expansion tank is attached to the water system and may be pressurized with air on one side of a diaphragm within the tank. When the water pressure increases due to thermal expansion, the tank begins to fill with water pressurizing the air on the other side of the diaphragm. When the water volume begins to expand due to heat, it needs to go somewhere. So, the expanded water goes into one side of the tank compressing the air on the other side. This prevents any part of the system from giving way to the expanding water.

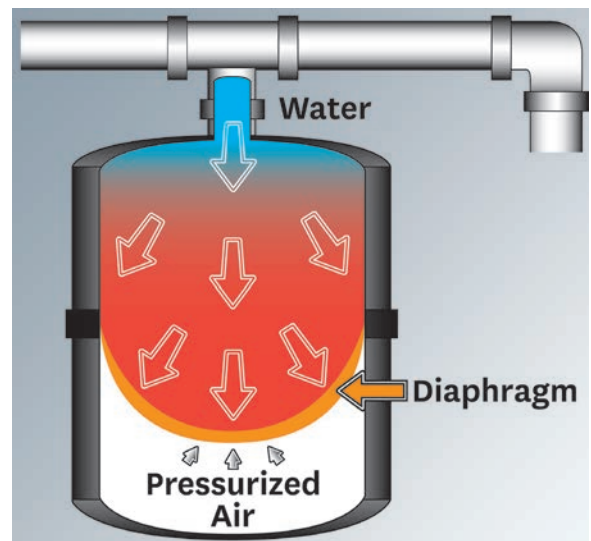


Expansion tank

Although an expansion tank may help solve a thermal expansion problem, water hammer may be so powerful that an expansion tank may not be enough to help. A water hammer arrester may be installed to reduce the effects

of the water hammer. An arrester, similar to an expansion tank, uses a cushion of air to help absorb the shock wave.

In other cases, some re-engineering of the water system may be necessary to eliminate the threat of thermal expansion and water hammer. For example, solenoid valves could be adjusted to close very slowly, instead of quickly which would likely cause water hammer. Adding a backflow prevention assembly at the



Expansion tank absorbs build up of pressure

service connection protects the potable water system but it may introduce other issues that customers may have not foreseen. And, in many cases removing the assembly to solve an issue is not the correct solution. In the cases involving thermal expansion and water hammer, additional equipment may be needed to solve the issues.

In any case, protecting the public's potable water supply from backflow is a necessity to ensure safe drinking water. ■

COMPLIMENTARY WEBINARS ON DEMAND

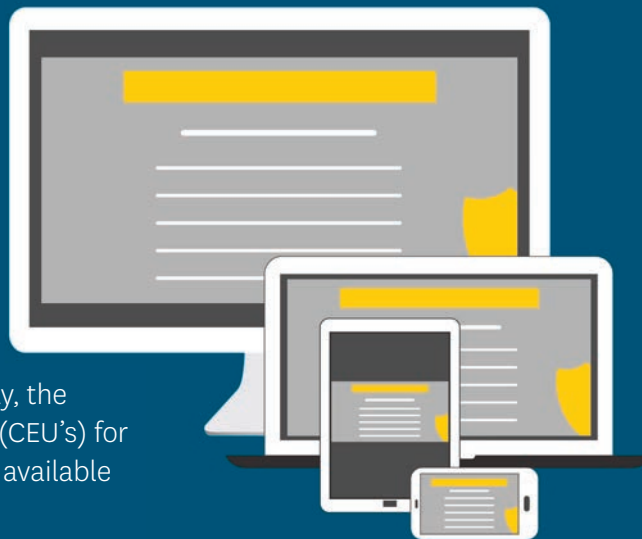
This year the USC Foundation made available a new benefit for Foundation members: complimentary live webinars. Members are eligible for at least one live webinar registration per year. Now, the Foundation is extending the complimentary live webinar benefit to include its *Webinars on Demand* series. Members who cannot attend the

live webinars will now have an option to receive at least one complimentary *Webinars on Demand* video per year instead.

The *Webinars on Demand* series consists of the slide and audio presentations that were made available during the live webinar broadcasts. So the *Webinars on Demand* series allows anyone to conveniently watch at their own pace and time. All *Webinars on Demand* may be viewed on any computer or mobile device with an Internet connection.

The *Webinars on Demand* are made available beginning 30 days after the live webinar broadcast and are available for nine months for members. Unfortunately, the Foundation cannot offer any continuing education units (CEU's) for *Webinars on Demand*. For a list of *Webinars on Demand* available today, please visit fccchr.usc.edu/ondemand.

The number of complimentary live webinars/*Webinars on Demand* per year is dependent on the type of membership. For a breakdown of complimentary registrations please visit fccchr.usc.edu/membership. ■



usc foundation endowments: continued continued from page 3

Education, research and service to the community are objectives set forth by the University and are continuously met by the Foundation. In addition to the scholarships mentioned above, the Foundation makes available student scholarships with the help of organizations like the SCWUA. Training events like the five-day training courses and live webinars continue to provide education and training to those involved in cross-connection control. Research projects are conducted with the help of local and national agencies to understand better the challenges of protecting the potable water supplies. And, the Foundation continues to develop needed training tools to assist those interested in backflow prevention and cross-connection control.

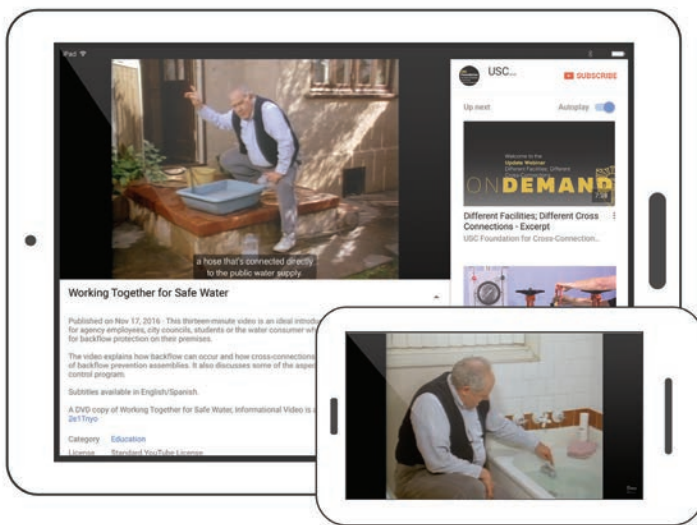
If any member is passionate about the Foundation's work and is interested in making a gift to the Foundation, please contact the Foundation. Rest assured that without the generosity of its members the Foundation would not be able to continue being the authority in backflow prevention and cross-connection control that it is today. ■

WORKING TOGETHER FOR SAFE WATER ON YOUTUBE

The USC Foundation's *Working Together for Safe Water, Informational Video* continues to be an excellent introduction to the basic concepts of backflow prevention and cross-connection control. The 15-minute video combines live footage and animation to help explain the concepts in terms that everyone will understand. And, now the Foundation is making the video available, in its entirety, on YouTube for anyone to watch.

Making the informational video available free of charge on the Internet via the most popular service for online video ensures that anyone who is new to backflow prevention and cross-connection control will have access

to it and the information needed to gain a basic understanding of the concepts involved. Today, with more people watching video on their mobile devices, making the informational video available online will allow anyone to have access to it at their convenience on the device of their choosing. Also, subtitles in English and Spanish are available when watching on YouTube.



The video will be available on the Foundation's YouTube channel found at youtube.com/uscfcchr. The informational video will continue to be available for purchase in DVD format from the Foundation and members may still purchase the video at the discounted member rate of \$25. ■

2017 USC LIST BOOK AVAILABLE IN JANUARY

Last year, the USC Foundation discontinued the mass printing of the *USC List of Approved Backflow Prevention Assemblies*. This decision helped the Foundation reduce its carbon footprint and focus its attention on delivering the USC List digitally. However, the Foundation understands the need of some of its members for a printed copy of the USC List. So, for 2017, the Foundation again will make available its annual printed version of the USC List free-of-charge at the member's request only.

Beginning in late January, all members may request a copy of the 2017 USC List book. Any additional copies of the 2017 USC List book may be purchased from the USC Foundation online store.

The Foundation encourages everyone to access the USC List online. Members may access the USC List from the Foundation's website and view it in PDF, Excel worksheet and mobile app. The Excel worksheet and mobile app allows anyone to sort and filter through the USC List in a more efficient manner.

If you have any questions or would like to request a copy of the 2017 USC List book, please contact the Foundation office via phone or email. ■

Upcoming Training Courses

all courses in Los Angeles, CA

Tester

9-13 January 2017

13-17 March 2017

10-14 July 2017

16-20 October 2017

Specialist

23-27 January 2017

24-28 April 2017

24-28 July 2017

30 Oct. - 3 Nov. 2017

Webinars

7 February 2017

The USC Approval Program

18 April 2017

Regulations & Plumbing Codes

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Upcoming Events

**TREEO Annual Cross-Connection
Control Conference**
Daytona Beach, FL
15-16 February 2017

**24th Annual
Spokane Regional
Cross-Connection Control
Chapter Seminar**
Spokane, WA
23 February 2017

Nebraska ABPA Conference
Kearney, NE
8 March 2017

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