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Foundation for
Cross-Connection
Control and
Hydraulic Research

Protection for Post Mix Carbonators

One of the common questions received in the Foundation office has to do with the level of backflow protection needed on post mix soft drink carbonators. The post mix soft drink carbonator takes water and carbonates it using Carbon Dioxide (CO₂) from a refillable tank.

This carbonated water is then mixed with syrup to produce the soft drinks served at restaurants, movie theaters at other establishments. This type of system is illustrated in figure 1.

Initially one wonders whether any backflow protection is needed. After all, we drink the sodas don't we? What would be the problem if some soda got into the drinking water? Further investigation shows that the CO₂ is under pressure and could, thus, create backpressure into the drinking water system. In such a case when backpressure is present a minimum of a double check valve assembly is typically required. There would, however, seem to be no contaminants (i.e., health hazards) which would warrant a reduced pressure principle assembly.

Yet further investigation demonstrates that there is a potential for the CO₂ or carbonated water to backflow into the water supply copper piping. This is where the problem occurs. The acidic carbonated water or carbon dioxide may leach the copper out of the copper piping. This may be detected by

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Manual Review Committee Update

Most of what the Manual Review Committee has worked on towards the tenth edition has been on Section Ten, the standards for backflow preventers. Most of these items being addressed have been discussed at open meetings of the MRC. Some of the items require additional technical data, which the Foundation's Engineering Staff is gathering now. The decisions made after the accumulation and discussion of the various data will mainly affect the design and performance of the backflow preventers themselves.

The Manual, however, has many areas, which may have more impact on those who use the Manual as a reference tool or guideline for their cross-connection control program. One area that will be changed dramatically is the combination of Sections 5 and 7 into one section, which will be much clearer. This new section will list facilities where backflow protection is typically required (similar to the current section 7). Each facility will include a list of water using equipment, which may be found at such a facility.

The new combined section will include an extensive list of water using equipment, which will be cross-referenced with the facilities. This list will include more than just names of water using equipment. Illustrations of much of the equipment will be included along with explanations of the water use which

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I n s i d e C r o s s T a l k

Post Mix Carbonators • Three Questions
Changes in the Manual

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Foundation Membership

The Foundation's Membership Program provides many benefits to the Members of the Foundation. These include: twenty percent discounts on Foundation Training courses for any employee of the Member company/organization, the *List of Approved Backflow Prevention Assemblies*, printed quarterly, and access to the up-to-the-minute version of the List for those Members with Internet access.

Members are encouraged to call the Foundation with technical questions. The Foundation's Engineering Staff is available to assist Members with the various aspects of field testing backflow preventers, installing backflow preventers, administering their cross-connection control program.

American Backflow Products Co.
American Leak Detection
Backflow Engineering Group
City of Benicia
City of Bloomington
City of Blythe Water Dept.
Cullins Plumbing
& Fire Protection
Dowl Engineers
Flo-Rite Testing
City of Kelowna
Fluid Meter Service Corp.
Gill Sewer & Darin
Green River Community College
Hydro 9 Irrigation District
Kapalua Water Co.
L. A. Gas and Water Works
County of Lander
Moapa Valley Water District
North County Plumbing
Pala Environmental Protection
Agency
Rural Community Assistance
Corporation
City of Salem, VA
San Francisco Water Dept.
Schmidt Fire Protection
Siloam Water Association
State of Utah
UA Local 525 JATC
Union Camp

Contacting the Foundation

Mailing Address:

Foundation for Cross-
Connection Control and
Hydraulic Research
University of
Southern California
Kaprielian Hall 200
Los Angeles, CA 90089-2531

Phone:

213 740 2032

FAX:

213 740 8399

e-mail:

fccchr@usc.edu

Web Site:

www.usc.edu/dept/fccchr

The Foundation accepts Purchase Orders via mail or fax and credit card orders (Visa, MasterCard, Discover) via telephone and the Web.

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The Manual

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will help determine if the water use is a direct or indirect cross-connection and where the equipment would constitute a health hazard, or a non-health hazard.

Ideally, the end user could take the Tenth Edition, look up the facility they are concerned with, and know what type of water using equipment one might expect to find there. Then they could look at the cross-reference to determine what type of cross-connection and what degree of hazard would be expected. With this information the type of backflow protection necessary is quite easily determined. (See Three Questions on page three.) The problem with creating this section in this way, is that it is not actually possible to place all facilities into a group and always be accurate. Typically a certain type of facility may have specific equipment. However, every facility of that type may not. Also every piece of equipment isn't the same. Many facilities may have heat exchangers, for example, but some may be single walled heat exchangers and others double walled heat exchangers. Even though facilities and equipment will not always be exactly what we expect, this Section will be very helpful in preparing those who conduct site surveys. Going to specific facilities one can determine, in general, the equipment that may be found at such a facility. One can also gain some very specific insight about the various pieces of equipment, which may be encountered. Even if the equipment varies, at least the individual conducting the site survey is much better prepared for the survey once they prepare using this new Section of the Manual.

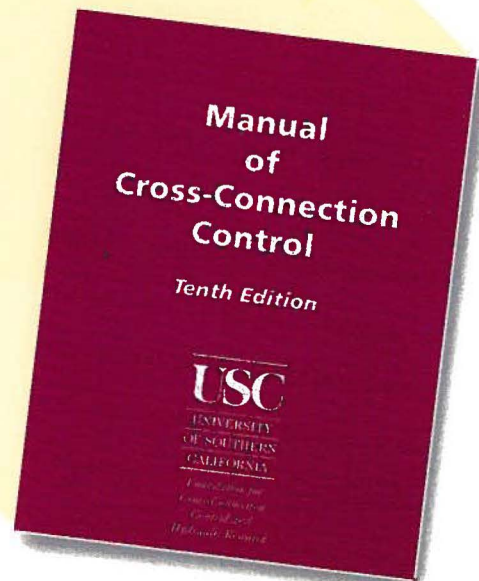
At this point in time the Committee is gathering information (i.e., pictures, illustrations, cross-sections, etc.) on all types of water using equipment and information about various types of facilities. Any information of this nature that you would like to contribute to the Committee, please send to The Manual Review Committee care of the Foundation Office.

The MRC may be contacted through the Foundation office. Information on the committee meetings may be found on the web.

Manual Review Committee
Foundation Office
University of Southern California
Kaprielian Hall 200
Los Angeles, CA 90089-2531

213 740 2032
FAX: 213 740 8399
fccchr@usc.edu
<http://www.usc.edu/dept/fccchr/MRC/>

The Committee is gathering information on all types of water using equipment. Any information of this nature may be contributed to the Committee, via the Foundation Office



Post Mix Carbonated Beverage Mixers

continued from page one

the discoloration of the water (i.e., blue water), or air (i.e., carbon dioxide) coming out of nearby faucets, or an “off-taste” in the soft drink being served. Ingesting large amounts of copper can cause acute gastrointestinal distress, vomiting and diarrhea. Should a person have food in their stomach, the proteins in the food may minimize the irritating effects of the copper. Because of this possibility of the leaching of the copper piping, there has been concern with any copper alloy being exposed to the carbonated water or CO₂. Therefore, we now have reason to need a reduced pressure principle assembly.

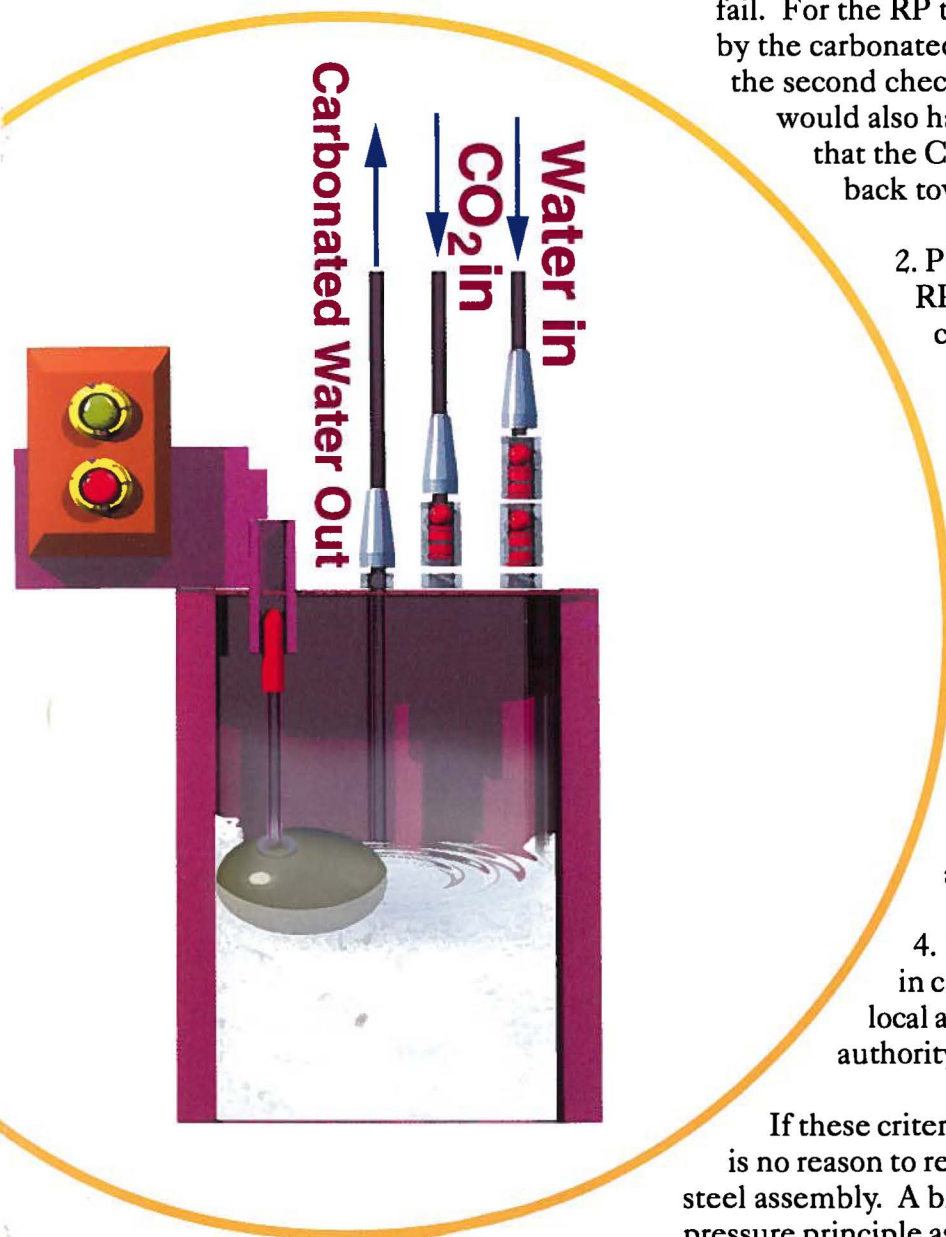
However, to complicate matters, the bronze materials from which most RPs (i.e., 2" and smaller) are constructed fall into the “copper alloy” category. This raises another issue of concern. To eliminate

copper alloy in the water line to the carbonator, some jurisdictions have been requiring a stainless steel bodied RP as the backflow protection. However, it is the Foundation’s position that an RP, bronze, plastic or stainless steel bodied, is acceptable with the following guidelines:

1. The carbonator pump does not exceed 175 psi, so that the RP is capable of handling the potential backpressure. (Of course the

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backpressure would only occur if the non-vented double ball checks at the carbonator pump fail. For the RP to be contacted by the carbonated water or CO₂, the second check of the RP would also have to fail so that the CO₂ could travel back towards the RP.)

2. Piping from the RP to the carbonator is not made of a copper alloy (i.e., copper tubing). Reinforced plastic or rubber, or stainless steel tubing is to be used.
3. RP is field-tested in-situ at least annually.
4. RP is installed in compliance with local administrative authority requirements.

If these criteria are met there is no reason to require a stainless steel assembly. A bronze reduced pressure principle assembly should provide adequate backflow protection and the potential of carbonated water coming in contact with the assembly is minimal.

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Notice about Cross Talk

Members will note that the summer issue of *Cross Talk* was not published this year. The Foundation will, however, be publishing a special edition of *Cross Talk* before the next regularly scheduled edition, to be published this winter. The special edition of *Cross Talk* will specifically outline the elements needed for an effective cross-connection control program. Members wishing to see specific items discussed in future editions of *Cross Talk* are encouraged to forward suggestions to the Foundation Office.

Three Questions

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Question Number

One: What type of cross-connection is it, indirect or direct?

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One needs to examine what type of cross-connection, if any, exists. Whether it be a cross connection at the system connection or a cross-connection at the point of use, one must decide if it is an indirect cross-connection or a direct cross-connection? An indirect cross-connection is a cross-connection which is subject to backsiphonage only. Backsiphonage is when the pressure upstream of the connection becomes sub-atmospheric, or drops to below atmospheric pressure. A direct cross-connection is a connection which is subject to backpressure. Backpressure is the condition that occurs when pressure downstream of the connection increases to a point above the pressure upstream of the connection, thus forcing the water to flow backwards through the connection.

So for question number one; if there is a potential for backpressure, it's a direct connection. If backsiphonage only, then it's an indirect connection.

Question Number Two: What is the degree of hazard? First we must define the degree of hazard. The *Manual of Cross-*

Connection Control, Ninth Edition defines degree of hazard as follows:

The term "degree of hazard" shall mean either a pollutional (non-health) or contamination (health) hazard and is derived from the evaluation of conditions within a system

So in other words, if a backflow condition occurs, what substance has the potential of getting into the water system? Is this substance considered a contaminant (i.e., a health hazard)? A health hazard is something that could cause illness or death if ingested. Or the substance could be a pollutant, (i.e., a non-health hazard) which is only aesthetically objectionable. This is something that may look bad, smell funny, or taste unusual, but will not

What is the degree of hazard?

cause illness or death if ingested. In some cases one may not know whether a substance is a pollutant or contaminant. In this case the administrative authority should contact the proper health authorities in order to determine whether the substance is a health hazard or non-health hazard. Material Safety Data Sheets (i.e., MSDS) would also be an excellent source of information.

Question Number Three: Is the system under continuous use (or pressure)?

Continuous use needs to be clearly defined. A connection under continuous use or flow would be a connection which would be under pressure for more than twelve of

any twenty-four hours and no shutoff valves or obstructions downstream.

Once all three of the above questions have been answered the determination of which type of backflow protection to install at the connection is easier. First a basic understanding of the use of the various backflow preventers is necessary.

Double Check Valve Assembly (DC) and DCDA

The double check valve assembly may be used to protect against direct or indirect cross-connections with pollutants present. It shall not be used to protect against a contaminant. The assembly may be used under continuous use.

Reduced Pressure Principle Assembly (RP) and RPDA

The reduced pressure principle assembly may be used to protect against a direct or indirect cross-connection with pollutants or contaminants present. The assembly may be used under continuous use.

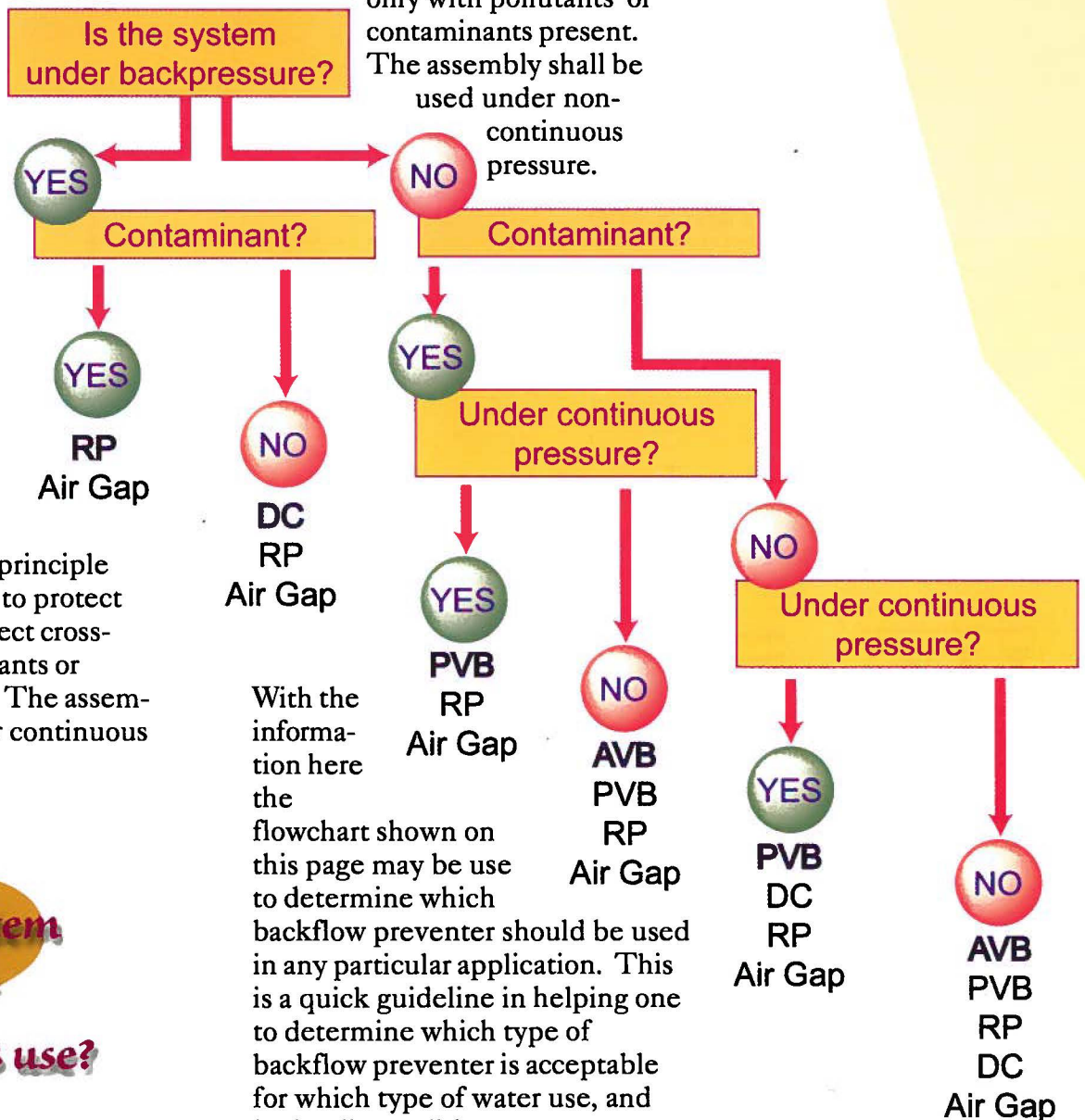
Pressure Vacuum Breaker Assembly (PVB) or Spill Resistant Pressure Vacuum Breaker (SVB)

The pressure vacuum breaker assembly may be used to protect against an indirect cross-connection only with pollutants or contaminants present. The assembly may be used under continuous pressure.

Atmospheric Vacuum Breaker (AVB)

The atmospheric vacuum breaker may be used to protect against an indirect cross-connection only with pollutants or contaminants present. The assembly shall be used under non-continuous pressure.

With the information here the flowchart shown on this page may be use to determine which backflow preventer should be used in any particular application



With the information here the flowchart shown on this page may be use to determine which backflow preventer should be used in any particular application. This is a quick guideline in helping one to determine which type of backflow preventer is acceptable for which type of water use, and hydraulic condition.

Training Courses

Tester Course

Los Angeles, CA
25-29 January 1999

Los Angeles, CA
10-14 May 1999

Escondido, CA
7-11 June 1999

Los Angeles, CA
12-16 July 1999

Specialist Course

Los Angeles, CA
1-5 February 1999

Incline Village, NV
15-19 March 1999

Los Angeles, CA
19-23 July 1999

Upcoming Events

Testing and Troubleshooting Update
Southern California ABPA
•Santa Margarita, CA
20 January 1999

Repair Session
Southern California ABPA
•Santa Maria, CA
17 February 1999

Ninth Annual TREEO Conference
•Gainesville, FL
25-26 February 1999

Michigan Backflow Prevention
Association Conference
•Southgate, MI
8-9 March 1999

AWWA Teleconference
•Various download cities throughout
the nation
11 March 1999

Utah ABPA Conference
•Salt Lake City, UT
19 March 1999

Testing and Troubleshooting Update
Southern California ABPA
•Foundation Laboratory,
Los Angeles, CA
24 March 1999



**Foundation for Cross-Connection
Control and Hydraulic Research
School of Engineering**

University of Southern California
Kaprielian Hall 200
Los Angeles, California 90089-2531

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