USC

1

UF TREEO Conference

Assembly Installation & Modifications That Can Affect The Approval

21st February 2024
Daytona Beach, FL

2

Presenter

Henry Chang
Chief Engineer, USC Foundation

3

Could an Assembly's Installation or Modifications to the Assembly Affect The Approval?

4

Abstract

Learn how some modifications and installations to an Approved backflow prevention assembly could not only invalidate its Approval (USC FCCCHR) but may affect its ability to perform properly.

5

What Does Approval Mean?

- Product / Assembly complies with a performance based standard
  - Standard defines what the material & design requirements are
  - Standard defines what a product is supposed to do
  - Standard defines a procedure for testing or evaluating
  - Standard defines cause for failure or rejection

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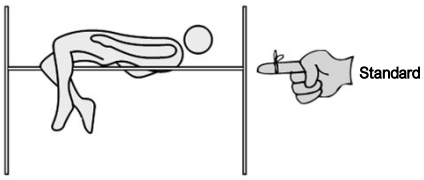
Approval Program

- Not a rating system
- Product meets minimum standard



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Approval Program

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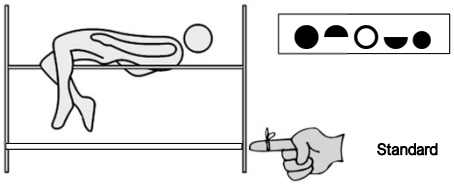
- Product meets minimum standard



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Backflow Preventers

- Approved/Listed?
  - By whom
- Responsibility of Administrative Authority
  - Water Supplier
  - Health Department

9

Backflow Preventers

Approval/Listing Agencies

- AWWA – American Water Works Association
- ASSE – American Society of Sanitary Engineering
- IAPMO – International Association of Plumbing and Mechanical Officials
- UL – Underwriters Laboratory
- FM – Factory Mutual
- Regional approvals
- USC - FCCCHR

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USC Approval Program

Approval Program

11

Standards

Current Standard:

Manual of Cross-Connection Control, Tenth Edition

Chapter 10

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Approval Program

- USC requires a two part process for an assembly to get approved:
  - Successfully complete
  - Laboratory Evaluation
  - Field Evaluation

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Approval Program
Laboratory

Submission of Working Drawings

Design Requirements

Material Requirements

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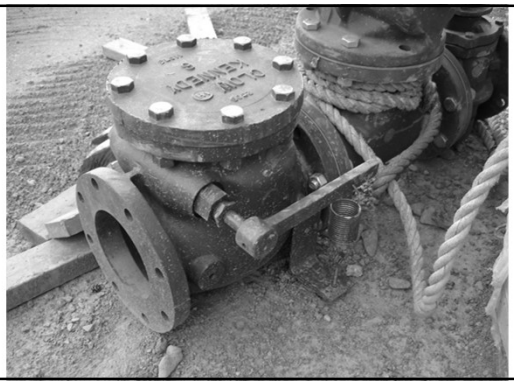

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Approval Program
Laboratory

- Submission of Working Drawings
  - Failure to comply with Design Requirements

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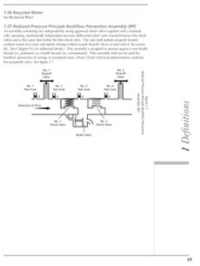
Reduced Pressure Principle Assembly (RP)
Component Identification



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1.57 Reduced Pressure Principle Backflow Prevention Assembly (RP)
An assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly. (See Chapter 10, for additional details.) This assembly is designed to protect against a non-health hazard (i.e., pollutant) or a health hazard (i.e., contaminant). This assembly shall not be used for backflow protection of sewage or reclaimed water.

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Approval Program Laboratory

- Submission of Working Drawings
- Hydrostatic Test
- Pressure (Head) Loss vs. Flow Rate
- Elastomer / Spring Documentation
- Backsiphonage and Backpressure Test
- Thermal Loop Testing
- Cycle test Testing

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Approval Program Field

- Field Evaluation

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Approval Program Field

- Twelve (12) Months Trouble-free Service
  - Typically, a minimum of three sites for each make, model, size, and orientation are required
- Initial field test and inspection
- Monthly field tests
- Final field test and inspection

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USC List Approval

- Approval granted for successful completion of Laboratory and Field Evaluation
- Placed on the USC List of Approved Backflow Prevention Assemblies
- Approved for three years
- Renewal Required

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USC Approval

- USC List of Approved Backflow Prevention Assemblies

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USC List on Mobile Devices

uscllist.com

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Backflow Preventers

General Statement of Policy Regarding Assembled Assemblies:

All assemblies, which consist of independent units assembled for the purpose of preventing backflow, shall comply with the material, operational and other specifications as required for backflow prevention assemblies. In order to ensure proper installations, all backflow prevention assemblies shall be delivered for installation completely assembled by the original manufacturer with all components as approved. Resilient seated shutoff valves and test cocks are considered integral parts of the assembly.

Chapter 10.1.1.1.6
Manual of Cross-Connection Control Tenth Edition

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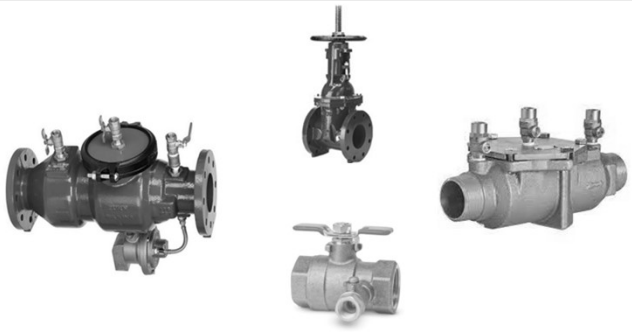

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Backflow Preventers

Modifications to backflow prevention assemblies will invalidate the Foundation for Cross-Connection Control and Hydraulic Research's approval. Assemblies must be installed and maintained in the configuration(s) and orientation(s) in which they were evaluated and approved. Shutoff valves may be replaced only with shutoff valves, which are approved for each size and model of assembly. Detector assemblies (i.e., DCDA, DCDA-II, RPDA, RPDA-II) are permitted to have the water meters replaced only with the acceptable water meters approved with each size and model of assembly. The bypass assemblies on detector assemblies may only be replaced with the specific assemblies approved with each size and model of assembly.

Chapter 10.1.1.1.7
Manual of Cross-Connection Control Tenth Edition

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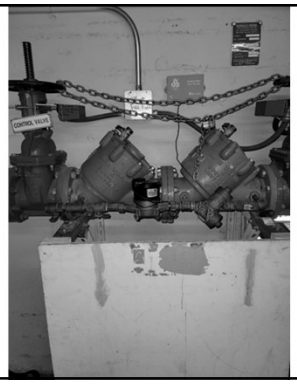

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Backflow Preventers

USC University of Southern California

Foundation for Cross-Connection Control and Hydraulic Research

800 545 6340 | fccchr@usc.edu | fccchr.usc.edu

Regarding Modifications to any USC Approved Backflow Prevention Assembly

The USC Foundation's approval of any assembly on the *USC List of Approved Backflow Prevention Assemblies* is invalid when an assembly has been modified in any way.

Modifications to an assembly may include: installation of an assembly in an orientation other than the orientation in which the assembly was approved, removing the shutoff valves, placing ells or other fittings between the main body and the shutoff valve. Additionally, assemblies may not be rotated on their axes. The shutoff valves may not be rotated either, with the following exception: The Foundation has determined that flanged assemblies of the 2½-inch and larger sizes may have their shutoff valves rotated one bolt hole without affecting the operation of the assembly. The Foundation will allow this without the approval status being affected.

All assemblies on the USC List go through a thorough laboratory and field evaluation. After an assembly successfully completes both phases of the approval program they are placed on the USC List. Since the assembly was submitted and approved by the Foundation under certain parameters, any modification to an approved assembly invalidates the USC Approval.

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Notice from List of Approved Assemblies

NOTICE REGARDING INSTALLATION:

Unless otherwise specified by the manufacturer all assemblies are to be installed on cold potable water applications - below 110ºF. Also all of the assemblies listed are Approved for the INDICATED ORIENTATION(S) ONLY. Rotation of assemblies on either axis will invalidate the USC Foundation's Approval. Use of spare parts other than those of the original manufacturer invalidates the Approval. Rotation of shutoff valves of one bolt hole only is permitted only for the 2 1/2" and larger flanged assemblies

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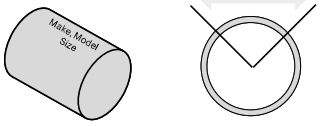
USC List of Approved Backflow Prevention Assemblies

- Markings
  - Make, Model, size required on assembly
    - Top (upper quadrant), or
    - Both sides



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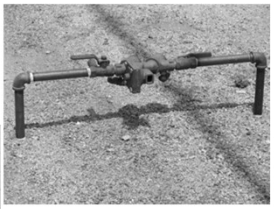
Installation
DC/RP



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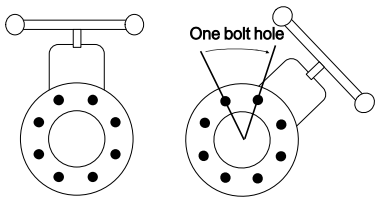
Other Issues
Shutoff Valves

- Policy – Flanged gate valves 2-1/2" – 12"
  - May be rotated one bolt hole



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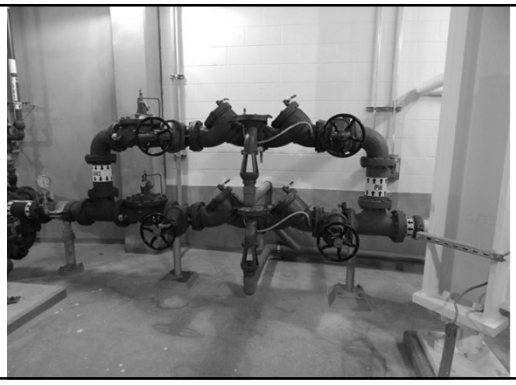

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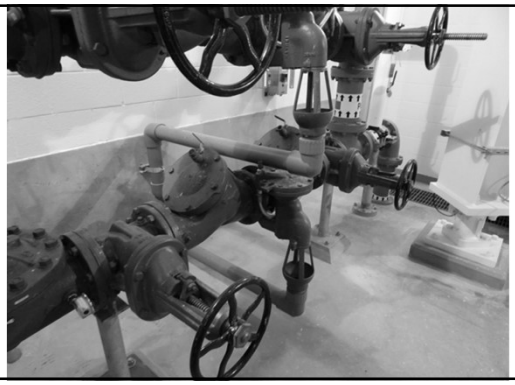

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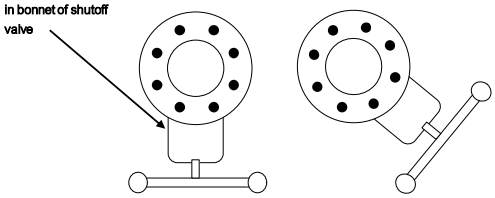
Other Issues
Shutoff Valves

- Beyond one bolt hole may effect performance of assembly, and operation of shutoff valve → Invalidates Approval



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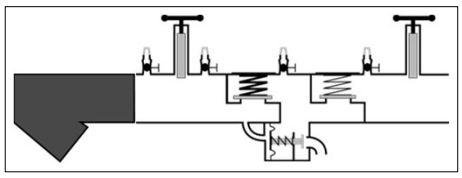
Approval Issues
Modifications



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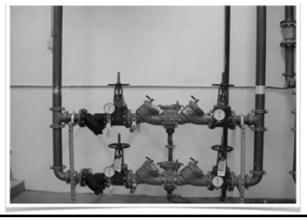

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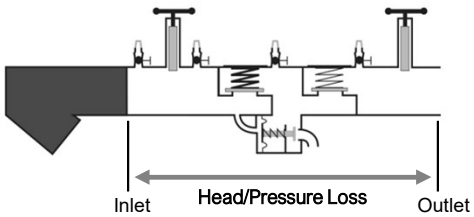

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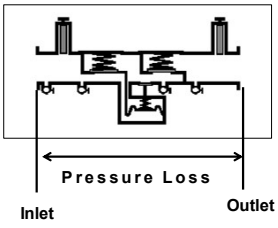
Approval Program
Laboratory –
Pressure (Head) Loss vs. Flow Rate



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Approval Program Laboratory

- Table 10-1 (DC & RP)
  Table 10-7 (PVB, SVB, AVB)
  - Size of Assembly (in / mm)
  - Rated Flow** (gpm / L/s)
  - Maximum Allowable Pressure Loss (psi / kPa)

** Adopted from AWWA Water Meter Stds

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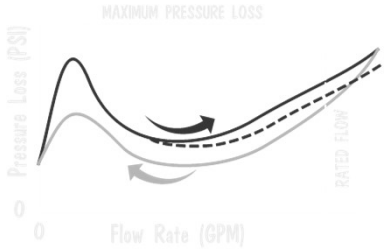
Approval Program Laboratory



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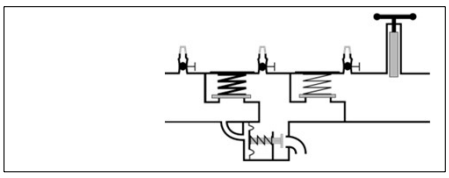
Approval Issues Modifications



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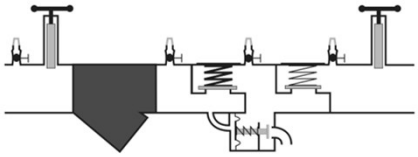

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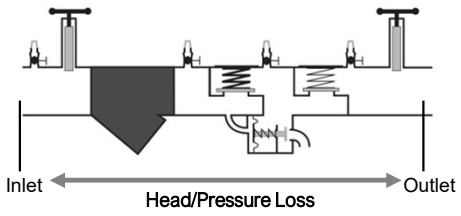
Approval Issues Modifications



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Approval Issues
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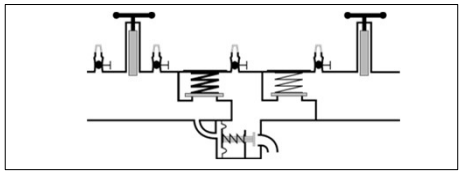

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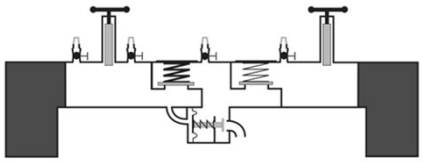

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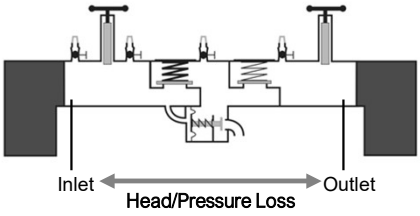

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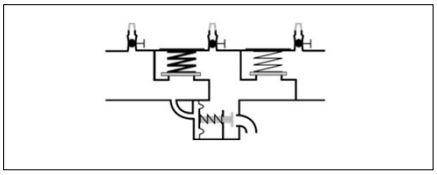

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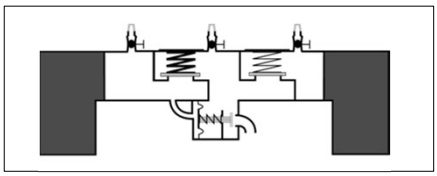

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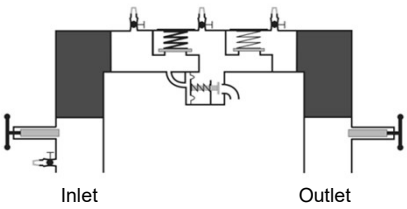

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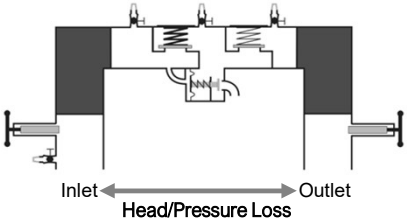

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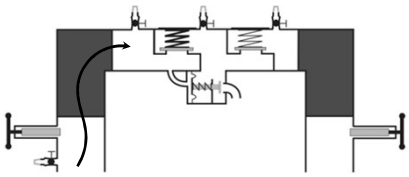

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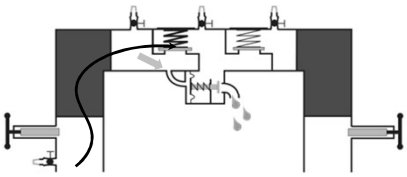

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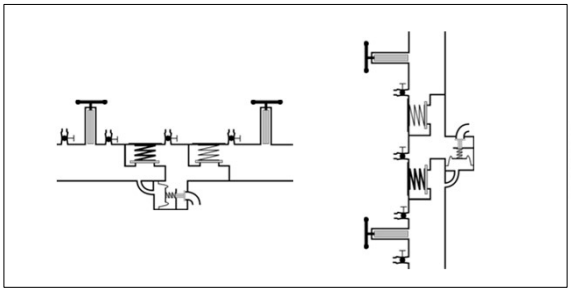
Installation
\RP Orientation



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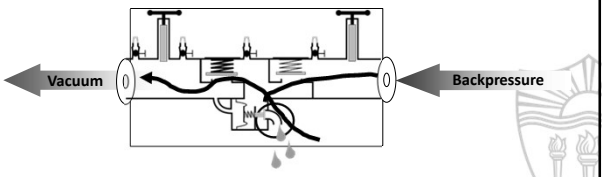
Approval Program Laboratory

RP – Backsiphonage / Backpressure Test



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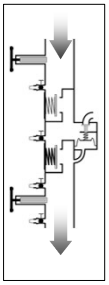
Approval Issues Laboratory

- Vertical up (VU) orientation



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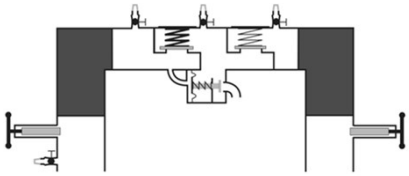
Reduced Pressure Principle Assembly (RP) Installation

Vertical Up?



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Reduced Pressure Principle Assembly (RP) Installation

Vertical Up?

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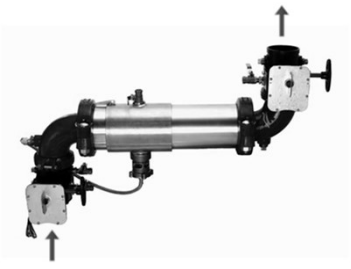
Reduced Pressure Principle Assembly (RP) Installation

Vertical Up?



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Approval Issues Modifications

- Test cocks

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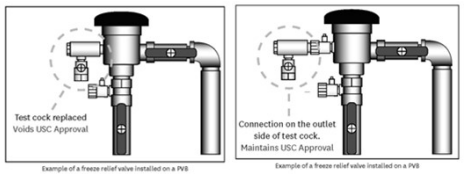
Approval Issues
Modifications

- Test cocks



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Is this Approved?

Will it prevent Backflow?

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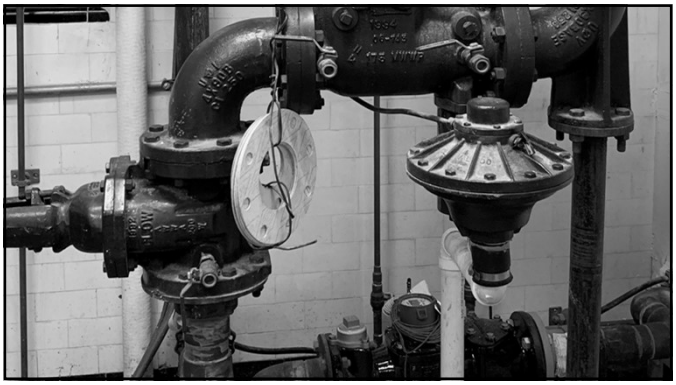

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Cla-Val RPV4 – 4”

15 March 1990 – 20 October 2008
Spare Parts No Longer Manufactured

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Wilkins 575M8 – 8”
11 April 1983—Present

Wilkins 575M10 – 10”
1 June 1983—Present

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USC List on Mobile Devices

usclist.com

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USC List of Previously Approved Assemblies

usclist.com

- No Longer Approved
  - When first approved
  - When removed from List
    - Stopped manufacturing
    - For cause

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USC List of Previously Approved Backflow Prevention Assemblies





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Could an Assembly's Installation or Modifications to the Assembly Affect The Approval?

YES!!!

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Contact Information

- Email – fccchr@usc.edu
- Toll Free – 866.545.6340
- Web – fccchr.usc.edu

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Social Media

- @uscfccchr
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Questions & Discussions

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