Today's Presenter

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About this Course

• This course is approved for ASPE CEU credits only
• This course is not approved for PDHs for PEs
• CPDs (Certified in Plumbing Design) or CPDTs (Certified Plumbing Design Technician) can use this course towards their recertification
  • aspe.org/CPD
  • aspe.org/CPDT
• This course may or may not be accepted for PE renewal
• Individuals must inquire with their state to determine if this is eligible for PE renewal or PDH credits

Lunch and Learn Objectives

At the end of this course you will be able to:

• Understand the history and necessity of detector assemblies, Type I and II
• Understand the hydraulics of detector assemblies, Type I and II
• Understand the benefits of Type II detector assemblies
• Assess the approval of a Type II detector assembly
• Understand how to test and report on a Type II detector assembly

Discussion Topics

• History of Backflow Innovation and Detectors
• Basic Hydraulics of DC, DCDA, RP, & RPDA
• Detector assemblies, what are they used for?
• Are they legal?
• What is a Type II Detector Assembly
  • Safe enough?
• Questions

History of Backflow at USC

1933
Cross connection at Chicago Worlds Fair kills 98

1940
USC begins training to protect potable water

1941
LA establishes Cross Connection Advisory Committee

1944
USC Paper No. 5 established field and lab tests for DC, RP

1948
USCFCCHR founded
History of Backflow at USC

- 1960 1st Edition
- 1966 3rd Edition
- 1985 7th Edition
- 1993 9th Edition
- 1965 2nd Edition
- 1988 8th Edition
- 2009 10th Edition

Most important question...

Why Detector Assemblies?

To respond to water authority’s concerns over loss of water (“non-revenue” water) in unmetered fire connections.

- Leakage
- Theft

Cross Connections

- Definition of a Cross Connection
  - From the ABPA FAQ’s. A cross-connection is any temporary or permanent connection between a public water system or consumer’s potable water system and any source or system containing non-potable water or other substances.
- Detector Assemblies are Cross Connections
  - Monitors accidental or unauthorized water use

Double Check Valve Assembly

ASSE 1015

- Non-health hazard protection
- Testable
- Allow adequate space for testing and repair
- Horizontal or vertical flow-up installations
- Typical use:
  - Where health hazards do not exist (irrigation with no chemicals, fire protection system, check with AHJ)

DC Static – No Flow

- 60 psi
- 59 psi
- 58 psi

DC Static – No Flow

- 60 psi
- 59 psi
- 58 psi
Double Check Detector Assembly 2 – 12”

ASSE 1048

- Backsiphonage / backpressure application
- Non-health hazard
- Continuous pressure
- Testable
- Monitors unauthorized water usage
- Install allowing for normal testing and maintenance
- Typical use:
  - Non health hazard fire protection systems or where AHJ requires

DCDA – Static Flow

DCDA – 2gpm

DCDA - Fire Flow

Reduced Pressure Zone Assembly

ASSE 1013

- Backsiphonage / backpressure protection
- Health hazard application
- Continuous pressure
- Occasional water discharge
- Install 12” above grade and allow space for normal testing and maintenance
- Typical Use:
  - Everywhere – Check with local AHJ

RP – Static Flow
Reduced Pressure Principle Detector Assembly

ASSE 1047

- Backsiphonage / backpressure application
- Health hazard application
- Continuous pressure application
- Testable
- Occasional water discharge
- Install 12" above grade and allow space for normal testing and maintenance
- Monitors unauthorized water usage
- Typical Use:
  - Fire Protection Systems where health hazards exist and the AHJ requires.

RPDA – Static Flow

RPDA – 1st 2 GPM

Pressure Loss RPZ vs. RPDA

Fire Flow

\[ 12.5 \text{ PSI} \]

RPDA

\[ 15 \text{ PSI} \]

\[ 2.5 \text{ PSI} \]
Allowable Pressure Loss (ASSE)

<table>
<thead>
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<th>Size</th>
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<th>RP</th>
<th>RPDA</th>
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DCDAs allowed 2 more psi!
RPDAs allowed 4 more psi!

Why the added pressure drop?

- Two checks, each 1.5-2 psi
- Main valve pressure loss must be increased by twice the 2 GPM flow through bypass
- Increased by how much?

Worst Case:
Main valve: 2 x 1.5 psi = 3 psi
Bypass: 2 x 2 psi = 4 psi
Increase: 4 psi + 1 psi = 5 psi minimum

Most important question…

Why Type II?
To respond to the fire protection industry’s concerns over the use of detector assemblies

ASSE Workgroup 1999

- ASSE workgroup reviewed fire industry concerns
  - Cost
  - Size
  - Ease of installation
  - Pressure Drop
- Reliability after long static periods
- Solution: Type II detectors

So what is a Type II?
What is the added pressure drop?

DCDA
- Two checks, each 1.5-2psi
- Main valve pressure loss must be INCREASED to ensure 2 GPM goes through bypass
- Increased by how much?

WORST CASE:
Main valve: 2 x 1.5psi checks = 3psi
Bypass: 2 x 2psi checks = 4psi
Increase: 4psi - 3psi = 1psi

DCDA II
- 2nd check bypassed, 1.5-2psi
- Main valve pressure loss must be INCREASED to ensure 2 GPM goes through bypass
- Increased by how much?

WORST CASE:
Main valve: 1 x 1.5psi check = 1.5psi
Bypass: 1 x 2psi check = 2psi
Increase: 2psi - 1.5psi = 0.5psi

Is RPDAII still safe?

RPDAII – Static Flow

RPDAII – Static Flow

RPDAII – Static Flow

RPDAII - Fouled
Why the added pressure drop?

RPDA
- Two check: 1st 6-8psi, 2nd 1.5-2psi
- Main valve pressure loss must be INCREASED to ensure 1st 2
  OPM go through bypass
- Increased by how much?

WORST CASE:
Main valve: 6psi + 1.5psi = 7.5psi
Bypass: 8psi + 2psi = 10psi
Increase: 10psi - 7.5psi = 2.5psi minimum

RPDA-II
- 2nd check bypassed, 1st 5-2psi
- Main valve pressure loss must be INCREASED to ensure 1st 2
  OPM go through bypass
- Increased by how much?

WORST CASE:
Main valve: 1 x 1.5psi check = 1.5psi
Bypass: 1 x 2psi check = 2psi
Increase: 2psi - 1.5psi = 0.5psi minimum

Questions on Type II DA’s?

- Why is it called a building if it is already built?
- Why does round pizza come in a square box?
- Why doesn’t glue stick to its bottle?
- Are they approved and how do you test them?

How do you know they are approved?

- Check the name plate
- Verify on manufacturers website
- Or Verify on approval agencies website

Testing of Type II’s

1. Different organization testing procedures cover Type II’s
2. Software manufacturer’s have Type II options now
3. Type II’s have two serial numbers just like traditional DA’s
4. Always check with the authority having jurisdiction

Sample test form

* University of Southern California Foundation for Cross-Connection Control and Hydrant Research
Type’s and who uses them?

- Who has used or tested a Type I?
- Who has used or tested a Type II?
- Who has read and registered the meter reading?

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