Why Do We Do That? – Field Testing Procedures
28 April 2021

TREEO Conference
Why Do We Do That? – Field Testing Procedures
28th April 2021
Virtual

What’s New at the USC Foundation?

Why Do We Do That During The Field Testing Procedures?

Field Testing Procedures
- USC 10th edition
- TREEO
- ABPA
- AWWA CA-NV
- ASSE-CA/AZ/UT

Field Testing Procedures Criteria
- Understand Operation of Assemblies
- Field Test Procedures
Steps Common to all Assemblies

- Preliminary Steps
- Flushing test cocks and/or vent valve
- Bleeding the field test kitgage

Steps Common to all Assemblies

- Preliminary Steps
- Flushing test cocks and/or vent valve
- Bleeding the field test kitgage

Preliminary Steps
Field Test Procedures

- Notify
- Identify
- Inspect
- Observe
**Preliminary Steps**

**Field Test Procedures**

- Notify
- Identify
- Inspect
- Observe

---

**Preliminary Steps**

**Field Test Procedures**

Which one do I test?

- Eeny Meeny Miney Mo

---

**Preliminary Steps**

**Field Test Procedures**

Which one do I test?

---

**Preliminary Steps**

**Field Test Procedures**

Identify
Why Do We Do That? – Field Testing Procedures
28 April 2021

Preliminary Steps
Field Test Procedures
Identify

Preliminary Steps
Field Test Procedures
Identify

Preliminary Steps
Field Test Procedures
Identify
- Notify
- Identify
- Inspect
- Observe

Field Issues
Field Test Procedures
Inspect

Field Issues
Field Test Procedures

USC FCCCHR – Henry Chang
Why Do We Do That? – Field Testing Procedures

28 April 2021

Field Issues
Field Test Procedures

Preliminary Steps
Field Test Procedures

- Notify
- Identify
- Inspect
- Observe

Observe
Field Issues
Field Test Procedures

Observe
Field Issues
Field Test Procedures

Observe
Field Issues
Field Test Procedures

Observe
Field Issues
Field Test Procedures

Observe
Field Issues
Field Test Procedures
Steps Common to all Assemblies

- Preliminary Steps
- Flushing test cocks and/or vent valve
- Bleeding the field test kit/gage

Steps Common to all Assemblies

- Preliminary Steps
- Flushing test cocks and/or vent valve
- Bleeding the field test kit/gage
Why Do We Do That? – Field Testing Procedures
28 April 2021

Steps Common to all Assemblies

- Preliminary Steps
- Flushing test cocks and/or vent valve
- Bleeding the field test kit/gage

Air
Water

Compressible and Incompressible flows
Why Do We Do That? – Field Testing Procedures
28 April 2021

Standards

QUIZ QUESTION
In which Edition of the USC Manual was the new Standard added for Double Check Detector Assemblies (DCDA)?


Reduced Pressure Principle Assembly (RP)

RP Assembly

• Three Components
  - First Check Valve
  - Second Check Valve
  - Relief Valve

RP – Field Test Procedure

• Test No. 1 – Relief Valve Opening Point Test
• Test No. 2 – Tightness of No. 2 Check Valve
• Test No. 3 - Tightness of No. 1 Check Valve

• Test No. 1 – Relief Valve Opening Point Test
  - Why do we test the relief valve first in an RP?
**RP – Field Test Procedure**

- Test No. 1 – Relief Valve Opening Point Test

- It is one of the objectives of the field test procedure to determine the opening point value of the relief valve; the first time it opens under normal field operation.

| 89 |

**RP – Field Test Procedure**

- Test No. 1 – Relief Valve Opening Point Test

- In normal field operation, the relief valve may not get exercised prior to the occurrence of a backflow condition. Therefore, the corresponding field test should evaluate the assembly under the same conditions.

| 90 |

**Exercising the Relief Valve**

- Avoid the premature discharge of the Relief Valve
- Avoid exercising The Relief Valve
  - Not a repair technique
  - Misleading test result

| 91 |

**Causes of Premature RV Discharge**

- Improperly Flushing Testcocks
- Improperly Bleeding FTG/Gage
- Testing Check Valves First
- Opening the #2 test cock too quickly
- Closing #2 shut-off valve too early
- Closing #1 shut-off valve

| 94 |
Why Do We Do That? – Field Testing Procedures
28 April 2021

RP – Field Test Procedure
- Test No. 1 – Relief Valve Opening Point Test
  - Flushing of the Testcocks
  - Open #4, #3, #2 (slowly) and #1 TCs to flush the TC, then close #1, #2, #3 and #4 TCs.

95

96

RP – Field Test Procedure
- Test No. 1 – Relief Valve Opening Point Test
  - Flushing of the Testcocks

97

98

RP – Field Test Procedure
- Test No. 1 – Relief Valve Opening Point Test
  - Flushing of the Testcocks
  - Open #4, #3, #2 (slowly) and #1 TCs to flush the TC, then close #1, #2, #3 and #4 TCs.

99

100

USC FCCCHR – Henry Chang
Why Do We Do That? – Field Testing Procedures
28 April 2021

RP – Field Test Procedure

- Test No. 1 – Relief Valve Opening Point Test
  - Bleeding of Hoses and FTK/Gage

RP – Field Test Procedure

- Test No. 1 – Relief Valve Opening Point Test
  - Bleeding of Hoses and FTK/Gage
  - Open #3 TC & Bleed the low side of FTK/Gage
  - Open #2 TC (slowly) & Bleed the high side of the FTK/Gage
  - Close #2 SOV

RP – Field Test Procedure

- Test No. 1 – Relief Valve Opening Point Test
  - Bleeding of Hoses and FTK/Gage
  - Open #3 TC & Bleed the low side of FTK/Gage
  - Open #2 TC (slowly) & Bleed the high side of the FTK/Gage
  - Close #2 SOV

RP – Field Test Procedure

- Closing the #2 SOV too early

USC FCCCHR – Henry Chang
RP – Field Test Procedure

• Test No. 1 – Relief Valve Opening Point Test
  - Observing the apparent 1st ck reading
**RP – Field Test Procedure**

- Test No. 1 – Relief Valve Opening Point Test
  - Observing the apparent 1st ck reading

- Reading observed after the No. 2 SOV and FTK/gage bleeds are closed

- This is normally not recorded since it may not be the actual 1st ck reading

---

**RP Field Test**

Record First Check Reading?

**NO**

Due to possible small leak in No. 2 Shutoff Valve, reading is not valid.

---

**RP Field Test - RV Opening Point**

1/4 TURN

---

**RP – Field Test Procedure**

- Test No. 1 – Relief Valve Opening Point Test
  - Observing the apparent 1st ck reading

- Test No. 1 – Relief Valve Opening Point Test
  - Open high control needle valve approx. one turn
  - Open the low control needle valve no more than ¼ of a turn
Why Do We Do That? – Field Testing Procedures
28 April 2021

RP Field Test - RV Opening Point

More than a 1/4 TURN

RP – Field Test Procedure
• Test No. 1 – Relief Valve Opening Point Test

RP Field Test - RV Opening Point

Leaking No. 2 Shutoff Valve
More than a 1/4 TURN
Dynamic Condition through FTK/gage manifold

RP – Field Test Procedure
• Test No. 2 – Tightness of No. 2 Check Valve
  - Testing the No. 2 ck for tightness against backpressure
  - Not in the direction of flow

RP – Field Test Procedure
• Test No. 2 – Tightness of No. 2 Check Valve

RP – Field Test Procedure
• 2nd Check Valve
  • Direction of Flow Test
    Only Valid if No. 2 Shutoff Valve is Tight

USC FCCCHR – Henry Chang
**RP – Field Test Procedure**

- Test No. 2 – No. 2 Check Valve Leaking

**Field Test Procedures**
**RP – 2nd Check; 2nd Chance**

- Test No. 3 - Tightness of No. 1 Check Valve
  - Determine the static pressure drop across the 1st ck valve
  - Actual 1st ck reading and is recorded

**RP – Field Test Procedure**
**RP – Field Test Procedure**

- Test No. 3 - Tightness of No. 1 Check Valve

**RP – Field Test Procedure**

- Test No. 3 - Tightness of No. 1 Check Valve

**USC FCCCHR – Henry Chang**
Why Do We Do That? – Field Testing Procedures
28 April 2021

Field Testing Procedures

- USC 10th edition, TREEO, ABPA, AWWA CA-NV, ASSE-CA/AZ/UT
- Others

RP – Field Test Procedure

- One Hose Method

RP – Field Test Procedure

- Test No. 1 – Relief Valve Opening Point Test
  - It is one of the objectives of the field test procedure to determine the opening point value of the relief valve; the first time it opens under normal field operation.

RP – Field Test Procedure

- Test No. 1 – Relief Valve Opening Point Test
  - In normal field operation, the relief valve may not get exercised prior to the occurrence of a backflow condition. Therefore, the corresponding field test should evaluate the assembly under the same conditions.

RP – Field Test Procedure

- Test for Tightness of No. 1 Check Valve
- Test for Tightness of No. 2 Check Valve
- Tested Similar to a DC Test

RP – Field Test Procedure

- Test No. 3 – Relief Valve Opening Point Test
  - Tested at low pressure not the supply working pressure of the system or normal field operation
Reduced Pressure Principle Assembly (RP)

- Pressure Zones

Reduced Pressure Principle Assembly (RP)

- Pressure Zones in Relief Valve

Reduced Pressure Principle Assembly (RP)

- Relief Valve Pressure Zone

Reduced Pressure Principle Assembly (RP)

- Relief Valve Pressure Zone

Reduced Pressure Principle Assembly (RP)

- Relief Valve Pressure Zone

USC FCCCHR – Henry Chang
Double Check Valve Assembly (DC)

DC – Field Test Procedure
• When is a sight tube needed?
  - If the downstream test cock of the check valve body being tested is not at the highest point of that check valve; then a vertical tube is needed and must rise to the top of the check valve.

DC – Field Test Procedure
• When is it critical to have the FTKgage at the proper location?
  - The FTKgage must be held at the same level as the water in the vertical tube or the top of the test cock and must be located before the No. 1 shutoff valve is closed.
DC – Field Test Procedure

Gage Location – Not Too Low or High

PVB & SVB – Field Test Procedures

- Air Inlet Valve Canopy Reinstall

Field Issues
Field Test Procedures
Air Inlet Canopy
Why Do We Do That? – Field Testing Procedures
28 April 2021

PVB & SVB – Field Test Procedures

- Air Inlet Valve Opening Point Test

PVB & SVB – Field Test Procedures

- Air Inlet Opening Point Test
  - It is one of the objectives of the field test procedure to determine the opening point value of the air inlet valve; the first time it opens.

PVB & SVB – Field Test Procedures

- Avoid the premature opening of the Air Inlet Valve
- Avoid exercising The Air Inlet Valve
  - Not a repair technique
  - Misleading test result

USC FCCCHR – Henry Chang
Why Do We Do That? – Field Testing Procedures
28 April 2021

**PVB Field Test**

Do Not Force or Assist Opening of Air Inlet

**SVB Field Test**

Do Not Force or Assist Opening of Air Inlet

**Exercising the Air Inlet Valve**

- Causing the air inlet valve to open and close before recording the opening point.
- Will tend to increase the opening point value.
- Perhaps from failing value to passing value
- Air inlet valve doesn’t get “exercised” prior to needed use.

**PVB & SVB – Field Test Procedures**

- Test No. 1 – Air Inlet Valve Opening Point Test (fully open)

**SVB- Test Procedure Techniques**

- Filling the top of the Air Inlet with water
- Removing the vent screw from the vent valve
Overview of the Procedure Steps

• The proper performance of field test procedures is important to determine the working conditions of a backflow prevention assembly.

Overview of the Procedure Steps

• The steps in each of the field test procedures are important to be done in a certain order to properly determine the working conditions of a backflow prevention assembly.
Why Do We Do That? – Field Testing Procedures  
28 April 2021

Backflow Prevention Assemblies

• Health & Safety Device
• Protecting the Potable Drinking Water System

Conclusion

• Can shortcuts or not following the steps effect the outcome of Field Test Procedure and Results?
  
  YES

FOLLOW THE FIELD TESTING PROCEDURES

Questions & Discussion

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

Contact Information

Social Media

@uscfccchr
facebook.com/uscfccchr
youtube.com/uscfccchr
@uscfccchr

USC FCCCHR – Henry Chang