5.05 CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION

A. Denver Water is responsible for protecting its public water system from contamination due to backflow occurrences through residential, multi-family, irrigation, and/or commercial property water service connections (e.g., cross-connections) in accordance with CDPHE Regulation 11. Denver Water needs the assistance and the cooperation of the public and licensees to ensure this responsibility is met. Denver Water may request access to a property or facility to conduct an on-site cross-connection control audit.

Denver Water requires the installation of a containment assembly on commercial property service lines. In high hazard applications, a RP BFP assembly shall be installed. In low hazard applications, a DC BFP assembly may be installed at the discretion of Denver Water's Cross-Connection Control Section.

Failure to comply with installation and annual testing requirements may result in suspension of service.

B. An approved BFP assembly shall be manufactured in accordance with AWWA C510 and C511 and meet USC FCCCHR specifications. Components in contact with potable water shall be certified to comply with NSF/ANSI 61 and NSF/ANSI 372.

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C. Requirements for Approved USC FCCCHR BFP Assembly Installations Based on the Degree of Hazard:

1. A commercial domestic service line tap:

a. Requires an approved RP or DC to be installed on the domestic water service line 5-feet downstream from the meter pit or immediately upon entry into a heated part of the building 5-feet (maximum) from the wall or floor before any connections based on the degree of hazard.
b. Irrigation branch lines on a domestic service tap shall be located 5-feet downstream from the meter pit immediately upstream or downstream of the domestic containment assembly upon entry into a heated part of the building.

2. A commercial fire service line service tap:
   a. Installed as a wet pipe system with the use of extinguishing agents or antifreeze requires an approved RP to be installed on the fire service line immediately upon entry into a heated part of the building 5-feet (maximum) from the wall or floor before any connections and shall be in accordance with the Standard Drawings.
   b. Installed as a wet or dry pipe system without the use of extinguishing agents or antifreeze requires an approved DC to be installed on the fire service line immediately upon entry into a heated part of the building 5-feet (maximum) from the wall or floor before any connections.

   Branch lines and taps are not allowed on fire service lines downstream from the designated containment BFP assembly for any purpose other than fire protection. System branch lines designed with extinguishing agents or antifreeze (loops) shall be isolated ("containment by isolation") by the installation of an approved RP.
3. A dedicated irrigation service line tap:
   a. Requires an approved RP to be installed on the irrigation water service line 5-feet downstream from the meter pit or 10-feet downstream for irrigation installations with the use of a stop and waste valve; the line shall be above ground before any connections.
   b. Branch lines and taps are not allowed on dedicated irrigation water service lines for domestic (potable) use.
4. A commercial drinking fountain domestic service line tap:
   a. Requires an approved DC to be installed on the domestic water service line below ground, 5-feet downstream from the meter pit below ground; above ground, 10-feet downstream from the meter pit with the use of a stop and waste valve in an approved manhole/vault; or above ground, 5-feet downstream from the meter pit.
   b. Shall be installed in accordance with the Standard Drawings for services with only a drinking fountain to avoid water quality issues by minimizing the amount of water in the service line between the main and the drinking fountain.
5. A commercial recycled irrigation service line tap:
   a. Requires an approved RP to be installed on the irrigation water service line 5-feet downstream from the meter pit or 10-feet downstream for irrigation installations with the use of a stop and waste valve if chemical additives are used downstream from the meter, pumps are used downstream from the meter, or the existing or proposed system poses a risk to the integrity of the recycled water system.

b. The line shall be above ground before any connections.
c. Branch lines and taps are not allowed on recycled water service lines for domestic (potable) use.
d. BFP assembly installations on recycled water service lines shall be identified as Recycled Water in accordance with Chapter 11.

6. A domestic service line tap on the premises where an existing irrigation system is converted to a recycled water service:
   a. Requires an approved DC to be installed on the domestic water service line 5-feet downstream from the meter pit below ground in an approved manhole/vault or above ground before any connections.
7. A multi-family domestic service line tap:
   a. Requires an approved RP or DC acting as containment if the premises has a fire protection system or the premises has a common boiler.
   b. The BFP assembly shall be installed on the domestic water service line 5-feet downstream from the meter pit or immediately upon entry into a heated part of the building 5-feet (maximum) from the wall or floor before any connections based on the degree of hazard.
8. A domestic service line tap on the premises with a Dual Water Supply Agreement:
   a. Requires an approved DC to be installed on the domestic water service line 5-feet downstream from the meter pit below ground in an approved manhole/vault or immediately upon entry into a heated part of the building 5-feet (maximum) from the wall or floor before any connections.

      It is at the sole discretion of Denver Water's Cross-Connection Control Section to determine if the existing dual water supply poses a high risk to Denver Water's potable distribution system. The installation of a RP may be required 5-feet downstream from the meter pit in an above ground, heated enclosure before any connections.

      It is at the sole discretion of Denver Water's Cross-Connection Control Section to approve the proposed BFP assembly installation. A BFP assembly may not be removed from use, relocated, or substituted by another type of BFP assembly without the approval of Denver Water.
9. Examples of commercial properties supplied with recycled water or dual water sources that require a RP or DC BFP assembly:
   a. Where a recycled water irrigation system is designed to inject chemical additives and the use of pumps installed downstream from the meter and/or the proposed irrigation system poses a risk to the integrity of the recycled water system, an approved USC FCCCHR RP assembly shall be installed on the designated service line to the premises 5-feet downstream from the meter pit or 10-feet downstream with the use of a stop and waste valve.
   b. Where dual water is used for irrigation on a commercial, multi-family, or residential premises, an approved USC FCCCHR BFP assembly shall be installed 5-feet downstream from the meter pit on the domestic water service line. The type of BFP assembly will be determined by Denver Water's

Cross-Connection Control Section based on the degree of hazard encountered downstream of the meter.

D. Examples of BFP Assembly Installations:

1. A USC FCCCHR approved RP BFP assembly is required when:
   a. High-level security or restricted commercial properties do not allow Denver Water to gain access to conduct a cross-connection control audit of the property and/or facility. An approved RP assembly shall be installed 5-feet downstream from the existing meter pit in an above ground, heated enclosure.
   b. A landscape irrigation system is designed for the direct injection of chemical additives into the system. An approved RP assembly shall be installed on the designated service line to the premises 5-feet downstream from the meter pit or 10-feet downstream for irrigation installations with the use of a stop and waste valve.
   c. A temporary construction water license is issued by the Sales Administration Section for construction use. An approved RP assembly shall be installed on the temporary water service line entering the building or above ground, downstream from the meter pit before any connections.
   d. A low hazard DC BFP assembly, used as containment, is installed on a water service line downstream from the meter and a high hazard RP BFP assembly, used as isolation, is installed on internal plumbing to protect the public water supply. Both containment assemblies shall be tested annually and the report sent to Denver Water's Cross-Connection Control Section.
   e. A RP BFP assembly is required for irrigation system installations:
      1) An approved USC FCCHR RP BFP assembly shall be installed on the irrigation water service line 5-feet downstream from the meter pit or 10-feet downstream with the use of a stop and waste valve; the line shall be above ground before any connections.
      2) Existing PVBs shall be replaced with a RP when repairs cannot be made and/or the need to replace the PVB becomes necessary.
      3) Branch lines or taps are not allowed on dedicated irrigation water service lines for domestic (potable) use.
      4) Drainage shall be provided in accordance with the Manufacturer's and authority having jurisdiction's requirements in the event of relief valve discharge.
2. A USC FCCCHR approved DC BFP assembly is required when:
   a. There is a Dual Water Supply Agreement for the premises. An approved DC BFP assembly shall be installed on the domestic water service line 5-feet downstream from the meter pit below ground in an approved manhole/vault.
      1) It is at the sole discretion of Denver Water's Cross-Connection Control Section to determine if the existing dual water supply poses a high risk to Denver

Water's potable distribution system. This may require the installation of a USC FCCCHR RP BFP assembly 5-feet downstream from the meter pit in an above ground, heated enclosure before any connections.

2) It is at the sole discretion of Denver Water's Cross-Connection Control Section to approve in writing the placement of the BFP assembly at a distance greater than 5-feet from the meter and/or immediate entry to the premises due to driveways, sidewalks, trees, etc.

b. Fire protection systems are installed without extinguishing agents or antifreeze. An approved DC BFP assembly shall be installed on the designated water service line entering the building (i.e., the Mechanical Room or the Pump Room).

3. The following facilities represent high hazard commercial applications that shall be contained from Denver Water's distribution system by a USC FCCCHR approved containment RP BFP assembly:

Amusement parks
Auto repair facilities
Autopsy facilities
Battery shops
Car wash facilities
Chemical plants
Community gardens
Cooling towers
Dental clinics
Dispensary/Grow facilities
Dry cleaners
Dual water supplies
Electrical and electronic component Manufacturers
Firefighting systems
Food and beverage processing plants
Gas stations
Green courts
Golf courses
Gray water systems
Greenhouses
Health spas
Hospitals
Hotels
Hydraulic testing facilities
Irrigation systems
Jewelry Manufacturers
Kennels
Laboratories
Laundromats
Manufacturing facilities
Medical facilities
Metal plating industries
Mobile home parks
Morgues
Mortuaries

Motels
Multistory buildings (higher than 30-feet above the ground line)
Packing plants
Parks and recreation centers
Petroleum refineries
Pet shops
Photographic film processing facilities
Printing or screen printing shops
Radiator shops
Radioactive material processing plants
Recreational vehicle dump sites
Recycled water systems (chemical injection, booster pumps, or high-risk scenarios)
Rendering plants
Restaurants
Salons
Schools
Sewage treatment plants or facilities
Solar water heating units
Steam generating facilities
Stock yard facilities
Swimming pools
Tanneries
Tattoo parlors
Taxidermy shops
Veterinary facilities
Warehouses
Water features
Water play features
Waterfront facilities
Zoos

E. Testing Requirements for BFP Assemblies Installed on Potable and Recycled Water Services: The licensee is required to have a certified ABPA or ASSE tester inspect and test an existing or newly installed containment BFP assembly on dedicated and recycled water service lines, if applicable, upon installation and annually thereafter. Tests shall be conducted at the expense of the licensee. BFP assemblies shall be repaired or replaced at the licensee's expense when found to be defective. Records of tests, repairs, and replacements shall be kept by the licensee and a copy of the annual test provided to Denver Water.

Installed BFP assemblies that fail to meet the requirements of 5.05, but were approved assemblies at the time of installation, shall be excluded from the requirements if they have been properly maintained and pass annual testing. If the BFP assembly is replaced, the replacement shall be USC FCCCHR approved.

1. The tester is required to:
   a. Complete BFP assembly testing and submit test reports within 2 days of Denver Water's setting of the meter and turning on of the water service.

b. Submit a copy of the official ABPA or ASSE certification to Denver Water's Cross-Connection Control Section each time the certification is renewed.
c. Submit a copy of the test kit calibration certification annually.
d. Have a dedicated recycled water test gauge.
e. Complete the BFP assembly test report and submit a copy of the containment BFP assembly report to Denver Water's Cross-Connection Control Section within 5 days. Incomplete or illegible test reports will not be accepted. Test reports shall be supplied on Denver Water's test form which can be obtained from www.denverwater.org.
f. Indicate containment or containment by isolation on the test report.
g. The submission of isolation test results to Denver Water is not required by CDPHE.
h. Indicate the type of usage (i.e., domestic, irrigation, fire, or recycled) on the test report.
i. Confirm the premises ID, Denver Water service address, meter number, BFP assembly serial number, and record the values on the test report.
j. Contact Denver Water's Cross-Connection Control Section for discrepancies regarding the meter or BFP assembly.
k. Sign, date, and include the time of the test on the report.

Required test reports shall be submitted to Denver Water's Cross-Connection Control Section:

Phone:	303-628-5969
Fax:	303-794-8325
E-mail:	CrossConnectionControl@denverwater.org
Mailing Address:	Denver Water Attn: Cross-Connection Control 6100 W. Quincy Avenue Denver, CO 80235

2. Failed Assemblies:
   a. If the BFP assembly fails and cannot be repaired on the day of its failure, the Cross-Connection Control Section shall be notified by the certified ABPA or ASSE tester within 24 hours. A copy of the failed test report shall be submitted to the Cross-Connection Control Section within 3 days.
   b. The Property Owner is responsible for coordinating the necessary repairs to the BFP assembly and retesting the unit within 15 days. The Property Owner shall submit a passing test report to the Cross-Connection Control Section. Failure to comply may result in the suspension of water service.
   c. If the premises has a high hazard BFP assembly and is deemed a threat to public health (via the private plumbing system), it is at the discretion of Denver Water to suspend the dedicated water service line immediately. The Property Owner shall repair or replace the BFP assembly before water service will be restored.

F. Exemptions: Single-family residential customers are exempt from Denver Water's cross-connection control requirements unless the premises is served by a fire suppression system or a dual water supply. Dual water supply conditions require a Dual Water Supply Agreement to be in effect between Denver Water and the Property Owner. Multi-family residential customers are exempt from Denver Water's cross-connection control requirements unless the premises fall under the criteria listed in 5.05.C.7.

For questions or concerns related to cross-connection control, please contact Denver Water's Cross-Connection Control Section:
Office: 303-628-5969
E-mail: CrossConnectionControl@denverwater.org