

221100 BACKFLOW PREVENTION

Cornell's Design and Construction Standards provide mandatory design constraints and acceptable or required products for all construction at Cornell University. These standards are provided to aid the design professional in the development of contract documents and are not intended to be used verbatim as a contract specification nor replace the work and best judgement of the design professional. Any deviation from the Design and Construction standards shall only be permitted with approval of the University Engineer.

PART 1 GENERAL

1.01 RELATED CORNELL DESIGN AND CONSTRUCTION STANDARDS

- A. Section 210500 – Fire Protection Basic Materials and Methods
- B. Section 220500 – Plumbing Basic Materials and Methods
- C. Section 222500 – Plumbing (Potable) Water Treatment
- D. Section 230540 – Laboratories
- E. Section 232500 – HVAC Water Treatment

1.02 RELATED CORNELL STANDARD DETAILS

- A. Detail 3.4.4, Domestic Water Service Entrance and Meter Detail

1.03 SCOPE

- A. This section applies to all backflow prevention devices installed on domestic and fire water system services to prevent contamination of the potable water supply.

PART 2 PRODUCTS

2.01 GENERAL

- A. Backflow Prevention devices shall comply with NSF 61.

2.02 WATER SERVICE BACKFLOW PREVENTER

- A. All University domestic and fire water systems shall require backflow prevention devices including new and retrofit construction projects. As stated in Section 220500 Plumbing Basic Materials and Methods, the campus utilizes three (3) different

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potable water sources. Prior to developing the schematic design, the consultant shall consult the following authorities for the proper application of backflow prevention devices on University water systems, installation requirements, and permitting requirements/procedures:

1. Cornell University Fall Creek (Water Filtration Plant) - Refer to the *Cornell University Cross Connection Control Program* documents. Please contact the Water Filter Plant Manager at 607.255.1408 to request a copy of this manual.
 2. The City of Ithaca – Contact the Water and Sewer Division. Typically the City follows similar guidelines as outlined in the *Cornell University Cross Connection Control Program* documents for backflow prevention applications.
 3. The Town of Ithaca (Bolton Point Water Authority) – Contact the Public Works Department and refer to Part 1, Chapter 256, Article III of the Town of Ithaca Code. Water is provided by the Southern Cayuga Lake Intermunicipal Water Commission Bolton Point Water System. Refer to the Bolton Point Field Work Guide for additional requirements.
- B. For buildings where uninterruptable service is required, Cornell requires the potable water supply to the building be protected with two backflow prevention devices with integral strainers and piped in parallel. For non-critical potable water supplies, domestic water make-up to mechanical equipment and potable water connections to laboratory spaces, a single backflow preventer is acceptable.
- C. Where Reduced Pressure Zone (RPZ) devices are applied, they shall be located, without exception, in rooms that are above grade and that have adequate drainage. The RPZ-dedicated drains shall be sized for the full street-side release flow potential of the RPZ and shall be directed to sanitary or grade. Verify capability of existing drains to accept full flow discharge. If connection to sanitary sewer is determined to be infeasible or cost prohibitive, alternatives like discharging water to grade (lawn areas, only) with splash blocks to prevent erosion may be considered with review and approval by Cornell University Environmental Health & Safety Fire Protection Section and Environmental Compliance.
- D. Please refrain from specifying DCDA's and RPDAs (Double-Check Detector Assemblies and Reduced Pressure Detector Assemblies). Also, please reject DCDA's and RPDAs if proposed by the Contractor. Cornell does not employ detector assemblies because water use for fire protection is not metered. If they are installed, there is additional testing, inspection and maintenance work required. If a detector assembly does get installed inadvertently, Engineer shall direct Contractor to remove said assembly.

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- E. Cornell acceptable backflow prevention devices are as follows:
 - 1. Watts Water Technologies, Reduced Pressure Zone Assembly Model 994
 - 2. Watts Water Technologies, Double Check Valve Assembly Model 774
 - 3. Conbraco Industries, Reduced Pressure Zone Assembly Model RP4A
 - 4. Watts Water Technologies, Double Check Valve Assembly Model 007
 - 5. Watts Water Technologies, Reduced Pressure Zone Assembly Model 009
 - 6. Watts Water Technologies, Reduced Pressure Zone Assembly Model LF909

- F. In certain cases, deviation from this requirement will be considered on a case by case basis. Please consult with Facilities Engineering for further information.

- G. Backflow preventer assemblies shall be installed to prevent freezing, flooding and mechanical damage with the following clearances:
 - 1. 30 to 60-inches above floor from the centerline of the assembly.
 - 2. 18 inches minimum from the bottom of device or reduced pressure zone relief valves.
 - 3. 12 inches minimum above the assembly.
 - 4. 30 inches minimum in front of the assembly.
 - 5. 8 inches from the back side of the device.

- H. Provide strainer upstream of potable system backflow prevention device.

- I. Reduced Pressure Zone (RPZ) discharge shall be sized for catastrophic failure of the relief valve. Discharge flow shall be determined by the manufacturer’s listed maximum discharge rate based on distribution system pressure or on-site pressure; whichever is greater.

- J. RPZ drainage shall be via gravity drain. If sump pumps are used they must accommodate the maximum discharge rate and be connected to an emergency power supply.

- K. Acceptable RPZ discharges are as follows:
 - 1. Sanitary Sewer – Connection shall be trapped and include a backwater check valve.
 - 2. Grade – Discharge shall be terminated above grade in a location not subject to flooding. Piping termination shall include a Waterman Red Top PF-25 flap valve.

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