SECTION 06200
CROSS CONNECTION CONTROL

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A. APPROVED BACKFLOW PREVENTION ASSEMBLIES

1. The following are the approved types of “backflow prevention assemblies” for use within Cary to prevent backflow into Cary’s public potable water system. All backflow prevention devices shall have received approval of their design and construction from the American Society of Sanitary Engineers (ASSE), or the American Water Works Association (AWWA), or USC, or the Foundation for Cross Connection Control and Hydraulic Research, whichever is most restrictive. All backflow prevention assemblies with brass components shall meet the requirements of the 2011 Reduction of Lead in Drinking Water Act. All brass parts shall be ‘no lead’ brass and meet UNS C89833 as per ASTM B584.

   a) Air gap. An “air gap” is a physical separation between the free-flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An “approved air gap” shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel - in no case less than 1 inch (2.54 cm).

   b) Atmospheric Type Vacuum Breaker (AVB). An “atmospheric type vacuum breaker” (also known as the “non-pressure type vacuum breaker”) is a device containing a float-check, a check seat, and an air inlet port. The flow of water into the body causes the float to close the air inlet port. When the flow of water stops, the float falls and forms a check valve against back siphonage and at the same time opens the air inlet port to allow air to enter and satisfy the vacuum. A shutoff valve immediately upstream may be an integral part of the device. An atmospheric vacuum breaker is designed to protect against a non-health hazard (isolation protection only) under a back siphonage condition only.

   c) Double-Check Valve Assembly [DCVA]. A "double-check valve assembly” is an assembly composed of two (2) independently acting, approved check valves, including tightly closing shut-off valves attached at each end of the assembly and fitted with properly located test cocks. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).

   d) Double-Check-Detector Assembly [DCDA]. A “double-check-detector assembly” is a specially designed assembly composed of a line-size approved double-check valve assembly with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall only be used to protect against a non-health hazard (i.e., pollutant).

e) Reduced Pressure Principle Backflow Prevention Assembly [RP]. A "reduced pressure principle backflow prevention assembly" is an assembly containing within its structure a minimum of two (2) 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 first check valve reduces the supply pressure to a predetermined amount so that during normal flow and at cessation of normal flow, the pressure between the checks shall be less than the supply pressure. In case of leakage of either check valve, the pressure differential relief valve, by discharge to atmosphere, shall operate to maintain the pressure between the checks less than the supply pressure. The unit shall include tightly closing shutoff valves located at each end of the assembly and each assembly shall be fitted with properly located test cocks. The assembly is designed to protect against a health hazard (i.e., contaminant). The Reduced Pressure Principle Backflow Prevention Assembly shall not be installed in a vertical configuration.

f) Reduced Pressure Principle-Detector Assembly [RPDA]. A "reduced pressure principle-detector assembly" is a specially designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. The meter shall register (in U.S. gallons) accurately for only very low rates of flow and shall show a registration for all rates of flow. This assembly shall be used to protect against health hazard (i.e., contaminant). The Reduced Pressure Principle Detector Assembly shall not be installed in a vertical configuration.

g) Pressure Type Vacuum Breaker [PVB]. A "pressure type vacuum breaker" is an assembly containing an independently operating internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located test cocks and tightly closing shutoff valves attached at each end of the assembly. This assembly is designed to protect against a health hazard (i.e., contaminant) under a back siphonage condition only.

h) Residential Dual Check (RDC). A "residential dual check valve" is an assembly, without test cocks or ports, containing two independently operating spring loaded, poppet type check valves, in series, which can be easily removed and replaced. This assembly is suitable for installation in a water meter vault or pit, below ground.

B. INSTALLATION OF ASSEMBLIES

1. All new construction plans and specifications, when required by these Specifications, or by the North Carolina Building Code, to have cross connection control devices, shall be made available to Cary for review and approval and to determine the degree of hazard.

2. All backflow prevention assemblies shall be installed in accordance with these Specifications and/or in the latest edition of the North Carolina Building Code, whichever is most restrictive.

3. All backflow prevention assemblies shall be installed in accordance with the manufacturer's instructions.

4. All backflow prevention assemblies connected to piping 2 ½ inches in diameter or larger shall be provided with gate valves on each side of the backflow prevention assembly. Each of these gate valves shall be operated by an outside screw and yoke assembly with a hand wheel. Non rising stem gate valves will not be acceptable.

5. In the event of a conflict between a manufacturer's instructions for installation and the North Carolina Building Code, the North Carolina Building Code shall prevail. In the event of a conflict between these Specification and a manufacturer's instructions for installation, these Specifications shall prevail, unless judged otherwise by the Director of Public Works and Utilities.

6. All double-check valve assemblies must be installed in a location in which no portion of the assembly can become submerged in any substance under any circumstance. Pit and/or below grade installations are prohibited. Double-check valve assemblies may be installed in a vertical position with prior approval from Cary, provided the flow of water is in an upward direction and the double check assembly is approved for vertical installation by the manufacturer.

7. Reduced pressure principle backflow prevention assemblies must be installed in a horizontal position and in a location in which no portion of the assembly can become submerged in any substance under any circumstance. Pit and/or below grade installations are prohibited.

8. All backflow prevention assemblies installed outdoors shall be provided with a weatherproof enclosure, which is capable of preventing freezing of these backflow prevention assemblies and any related valves and piping. Assemblies 2.5-inches and greater shall be installed in heated enclosures.

9. The customer is responsible to make sure a backflow prevention assembly is working properly upon installation. The consumer shall, at his own expense,

conduct testing of a backflow prevention assembly. Tests shall be conducted within ten (10) days of installation, and annually thereafter, with a record of all testing and repairs retained by the consumer. Each consumer shall send a copy of the test report, certified by the Certified Backflow Prevention Assembly Technican, for each test to Cary within thirty (30) days after the completion of each test. The consumer is required to furnish the following information to Cary on each test report for the following types of backflow prevention assemblies:

Types of assemblies requiring test reports:

- Double-check-detector assembly (DCDA)
- Double-check valve assembly (DCVA)
- Pressure vacuum breaker (PVB)
- Reduced pressure principle detector assembly (RPDA)
- Reduced pressure principle backflow preventer assembly (RP)

Information required in a test report:

- Service address where assembly is located.
- Owner (and address, if different from service address).
- Description of assembly's location.
- Date of installation.
- Installer (include name, plumbing company represented, plumber's license number).
- Type of assembly and size of assembly.
- Manufacturer, model number, serial number.
- Test results/report.

10. When it is not possible to interrupt water service, provisions shall be made for a "parallel installation" of backflow prevention assemblies. Cary will not accept an unprotected bypass around a backflow preventer. Any and all water meter bypases shall be locked, tagged and the tag dated with the last date that it was secured.

C. FACILITIES REQUIRING PROTECTION

1. Cary has identified the types of facilities or services as having a potential for backflow of non-potable water into the public water supply system. Those types of facilities requiring approved backflow prevention assemblies and the type of approved backflow prevention device required are listed in the list below. Other types of facilities or services not listed in the list may also be required to install approved backflow prevention assemblies, if determined necessary by Cary. All assemblies and installations shall be subject to inspection and approval by Cary.

Abbreviations used below:

- AG = Air Gap
- DCVA = Double-Check Valve Assembly
- DCDA = Double-Check Detector Assembly
- PVB = Pressure Vacuum Breaker
- RP = Reduced Pressure Principle Assembly
- RPDA = Reduced Pressure Detector Assembly
- RDC = Residential Dual Check

a) Automotive Services Stations, Dealerships, etc.:
    i. No Health Hazard: DCVA.
    ii. Health Hazard: RP.
b) Auxiliary Water Systems:
    i. Approved Public/Private Water Supply: DCVA.
    ii. Unapproved Public/Private Water Supply: RP.
    iii. Used Water and Industrial Fluids: RP.
c) Bakeries:
    i. No Health Hazard: DCVA.
    ii. Health Hazard: RP.
d) Beauty Shops/Barber Shops:
    i. No Health Hazard: DCVA.
    ii. Health Hazard: RP.
e) Beverage Bottling Plants: RP.
f) Breweries, Wineries, Distilleries: RP.
g) Buildings - Hotels, apartment houses, offices, public and private buildings, or other structures having unprotected cross connections:
    i. (Under three stories) No Health Hazard: DCVA.
    ii. (Under three stories) Health Hazard: RP.
    iii. (Over three stories) All: RP.
h) Canneries, packing houses, and rendering plants: RP.
i) Church:
    i. w/o Kitchen: DCVA
    ii. w/ Kitchen: RP
j) Commercial car wash facilities: RP.
k) Commercial greenhouses: RP.
l) Commercial sales establishments (department stores, malls, etc.):
    i. No Health Hazard: DCVA.
    ii. Health Hazard: RP.
m) Concrete/asphalt plants: RP
n) Dairies and cold storage plants: RP
o) Dye works: RP
p) Film laboratories: RP
q) Fire Systems ¾-inch to 2-inch:
    i. Health Hazard: RP
    ii. Health Hazard: (Booster Pumps, Foam, Antifreeze Solution, etc.): RP.
r) Fire Systems - 2 ½-inch to 10-inch or larger.

i. Health Hazard: RPDA
ii. Health Hazard: (Booster Pumps, Foam, Antifreeze Solution, etc.): RPDA.

s) Fire Trucks: RP.
t) Grocery Stores: RP
u) Hospitals, medical buildings, sanitariums, morgues, mortuaries, autopsy facilities, nursing and convalescent homes, medical clinics, and veterinary hospitals: RP.
v) Laundries:
i. No Health Hazard: DCVA.
ii. Health Hazard: (i.e., dry cleaners): RP.
w) Lawn irrigation systems (connected to potable water): RP
x) Metal manufacturing, cleaning, processing, and fabricating- plants: RP.
y) Mobile home parks:
i. No Health Hazard: DCVA.
ii. Health Hazard: RP.
z) Oil and gas sales (bulk wholesale, or retail) distribution, production, storage or transmission properties: RP.
aa) Pest control (exterminating and fumigating): RP.
bb) Power plants (electrical): RP.
cc) Reclaimed water mains connected to a potable water source: RP
dd) Restaurants:
i. No Health Hazard: DCVA.
ii. Health Hazard: RP.
ee) Residential (single family homes; individually metered dwelling units of the following types of multi-family dwellings: duplexes, triplexes, multiplexes, apartments, townhouses, condominiums): RDC.
ff) Restricted, classified, or other closed facilities: RP.
gg) Sand and gravel plants: RP.
hh) Schools and colleges: RP.
ii) Sewage and storm drain facilities: RP.
jj) Swimming Pools: RP.
kk) Waterfront facilities and industries: RP.

D. TESTING AND TEST EQUIPMENT

1. Frequency of Testing. Backflow prevention assembly tests shall be conducted upon installation and annually thereafter or at a frequency established by Cary. Following installation, all RP, DCVA, PVB, DCDA, and RPDA are required to be tested by a Cary certified back-flow prevention assembly technician within ten (10) days.

2. Test Equipment. All certified backflow prevention assembly technicians must obtain and employ backflow prevention assembly test equipment, which has been evaluated and/or approved by Cary. All test equipment shall be registered

with Cary and shall be checked for accuracy annually (at a minimum), calibrated if necessary, and certified to Cary as to such accuracy / calibration, employing a calibration method acceptable to Cary.

END OF SECTION 06200