

MEMORANDUM

To: Denver Water Engineering Standards Users

From: Katie L. Ross, P.E. – Distribution Engineering Manager

CC: Robert J. Mahoney, P.E. – Chief Engineering Officer
Jeremy M. Ross, P.E. – Director of Engineering – Projects

Date: January 31, 2020

RE: Denver Water Engineering Standards – 15th Edition
Errata 2 - Notice of Corrections

Revisions to the 15th Edition of the Engineering Standards are hereby published for immediate use.

ABBREVIATIONS – TECHNICAL SOCIETIES

DELETE:

Technical Societies

SUBSTITUTE:

Organizations

ABBREVIATIONS – TECHNICAL SOCIETIES

ADD:

CDOT - Colorado Department of Transportation

ADD:

FAA – Federal Aviation Administration

ABBREVIATIONS – GENERAL ABBREVIATIONS AND ACRONYMS

DELETE:

General Abbreviations and Acronyms

SUBSTITUTE:

Abbreviations and Acronyms

ABBREVIATIONS – GENERAL ABBREVIATIONS AND ACRONYMS

ADD: cm - Centimeters

ADD: ppm – Parts Per Million

CHAPTER 1 – GENERAL, SUBPARAGRAPH 1.06, PAGE 4:

ADD:

Corrective Action: Risk assessment, active remediation, passive remediation, voluntary cleanup, investigation, and/or monitoring of environmental contamination.

CHAPTER 1 – GENERAL, SUBPARAGRAPH 1.06, PAGE 5:

ADD:

Environmental Contamination: The presence of any hazardous material, including, but not limited to, any substances defined as or included in the definition of “hazardous substance,” “hazardous material” or “toxic substances” in the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601, et seq., the Hazardous Materials Transportation Act, 49 U.S.C. § 5101, et seq., the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, et seq., or any other federal, state or local statute, law, ordinance, code, rule, regulation, order, decree or other requirement of governmental authority regulating, relating to or imposing liability or standard of conduct concerning any hazardous, toxic or dangerous substance or material, as now or at any time hereafter in effect, and in the regulations adopted, published, and/or promulgated pursuant to said laws.

CHAPTER 1 – GENERAL, SUBPARAGRAPH 1.06, PAGE 7:

DELETE:

AMR

SUBSTITUTE:

AMR/AMI

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH A, SECOND SENTENCE, PAGE 10:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH A, SUBPARAGRAPH 11, FIRST BULLET, PAGE 10:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH B, SUBPARAGRAPH 3, TENTH BULLET, PAGE 11:

ADD:

Closed boundary valves

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH B, SUBPARAGRAPH 3, SEVENTEENTH BULLET, PAGE 12:

ADD:

Label connections between Denver Water and a Distributor with the specific point of change in ownership labeled between the systems.

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH B, SUBPARAGRAPH 3, EIGHTEENTH BULLET, SUBPARAGRAPH 1, PAGE 12:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH B, SUBPARAGRAPH 3, NINETEENTH BULLET, PAGE 12:

ADD:

For PRV installations, the plans shall include:

- 1) Location
- 2) Valve center-line elevation
- 3) Upstream and downstream pressure zone name
- 4) Nominal hydraulic grade line and associated pressure
- 5) Valve operating priority, as coordinated with the Distributor
- 6) Associated downstream operating pressure

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.05, SUBPARAGRAPH C, PAGE 13:

ADD:

Plans submitted in areas with environmental contamination shall include documentation of Corrective Action for review by Denver Water.

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.11, SUBPARAGRAPH B, FIRST SENTENCE, PAGE 17:

DELETE:

Developer

SUBSTITUTE:

Licensee

CHAPTER 2 – MAIN AND DISTRIBUTOR MAIN EXTENSIONS, SUBPARAGRAPH 2.11, SUBPARAGRAPH B, SECOND SENTENCE, PAGE 17:

DELETE:

Developer

SUBSTITUTE:

Licensee

CHAPTER 3 – SERVICE LINES, FIRE SERVICE LINES, METERS, AND APPURTENANCES, SUBPARAGRAPH 3.15, FOURTH PARAGRAPH, PAGE 29:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, FIRST SENTENCE, PAGE 35:

DELETE:

Developer

SUBSTITUTE:

Licensee

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, SUBPARAGRAPH A, SUBPARAGRAPH 3, FIRST SENTENCE, PAGE 37:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, SUBPARAGRAPH A, SUBPARAGRAPH 3, SECOND SENTENCE, PAGE 37:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, SUBPARAGRAPH A, SUBPARAGRAPH 3, SECOND BULLET, PAGE 37:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, SUBPARAGRAPH A, SUBPARAGRAPH 3, THIRD BULLET, PAGE 37:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 4 – EASEMENTS AND LICENSES, SUBPARAGRAPH 4.02, SUBPARAGRAPH A, SUBPARAGRAPH 4, FOURTH BULLET, PAGE 38:

ADD:

Denver Water, in its sole discretion, may require the Licensee or Property Owner to provide an opinion of counsel of Property Owner, on which Denver Water is entitled to rely, addressed and delivered to Denver Water, that there are no encumbrances on title to the easement(s) and the grantor of the easement(s) has good and marketable title.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.04, SUBPARAGRAPH A, SECOND PARAGRAPH, FOURTH SENTENCE, PAGE 44:

ADD:

The fire hydrant branch line shall not extend beyond the dedicated public ROW, easement, or property line by more than 25-feet as shown on the [Standard Drawings](#). Proposed fire hydrants requiring a full width easement shall be reviewed by Denver Water and approved at its discretion.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 1, SECOND BULLET, PAGE 46:

DELETE:

Irrigation branch lines on a domestic service tap shall be and 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.

SUBSTITUTE:

Irrigation branch lines on a domestic service tap shall be protected by an RP and 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.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 1, THIRD BULLET, PAGE 46:

ADD:

Install drainage in accordance with the Manufacturer and the authority having jurisdiction.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 3, FIRST BULLET, PAGE 46:

DELETE:

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.

SUBSTITUTE:

Requires an approved RP or PVB 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; there shall be no branch lines (e.g. hose bibs) upstream of the BFP assembly. Installed PVBs shall be located a minimum of 12-inches above the highest point of use and must not be installed where backpressure is present.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 5, SECOND BULLET, PAGE 47:

DELETE:

The line shall be above the ground before any connections.

SUBSTITUTE:

The service line shall be above the ground before any connections.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 7, THIRD BULLET, PAGE 47:

ADD:

Install drainage in accordance with the Manufacturer's and authority having jurisdiction's requirements in the event of a relief valve discharge.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH C, SUBPARAGRAPH 8, LAST PARAGRAPH, PAGE 47:

DELETE:

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.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH D, SUBPARAGRAPH 1, FIFTH BULLET, SUBPARAGRAPH 4, PAGE 49:

DELETE:

Drainage shall be installed in accordance with the Manufacturer's and authority having jurisdiction's requirements in the event of a relief valve discharge.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH D, SUBPARAGRAPH 3, PAGE 50:

DELETE:

Multistory buildings (higher than 30 feet above the ground line)

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH E, SECOND PARAGRAPH, PAGE 51:

DELETE:

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.

SUBSTITUTE:

Installed BFP assemblies that fail to meet the requirements of [5.05](#), but were approved assemblies at the time of installation, may remain if they have been properly maintained and pass annual testing.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH E, SUBPARAGRAPH 1, FIRST BULLET, PAGE 51:

DELETE:

2 days

SUBSTITUTE:

5 days

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH E, SUBPARAGRAPH 1, NINTH BULLET, PAGE 51:

DELETE:

Confirm the premises ID, Denver Water service address, meter number, BFP assembly serial number, and record the values on the test report.

SUBSTITUTE:

Confirm the Denver Water service address, meter number, BFP assembly serial number, size, manufacturer and model, location, and record the values on the test report.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH F, FIRST SENTENCE, PAGE 52:

DELETE:

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.

SUBSTITUTE:

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, a dual water supply, or other known hazards.

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.05, SUBPARAGRAPH F, THIRD SENTENCE, PAGE 52:

DELETE:

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](#).

CHAPTER 5 – SYSTEM DESIGN AND LAYOUT, SUBPARAGRAPH 5.07, THIRD PARAGRAPH, PAGE 53:

ADD:

PRVs between Denver Water and a Distributor shall be classified by three categories:

1. Distributor Owned, Maintained, and Operated: The operation of the PRV affects only the Distributor within which they are located, or have only a minimal potential for impact to Denver Water or a Total Service Contract Area. The PRV shall be entirely owned, operated, and maintained by the Distributor. The design and installation of the PRV shall comply with Chapter 2.
2. Denver Water Owned, Maintained, and Operated: The operation of the PRV affects only the Denver Water or Total Service Contract Areas within which it is located, or the PRV is in a Distributor area but has a greater impact to Denver or Total Service Contract Areas. The PRV will be entirely owned, operated, and maintained by Denver Water. A PRV equipped with Denver Water telemetry will be owned, maintained and operated by Denver Water. The design and installation of the PRV shall comply with Chapter 2.
3. Distributor Owned and Maintained, with Cooperative Operations: The PRV is located within the Distributor Contract Area but through interconnects to Denver or Total Service Contract Areas result in a larger impact to Denver and Total Service customers. The Distributor will own, operate and maintain the PRV while the downstream pressure setting will cooperatively be determined by Denver Water and the Distributor that integrates the distributor’s operation into the overall operation of Denver Water’s system. The design and installation of the PRV shall comply with Chapter 2.

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.04, THIRD PARAGRAPH, FIRST SENTENCE, PAGE 67:

DELETE:

The installation of mains through hazardous areas, at depths greater than 10-feet, and in the roadways of state and federal highways may require the selection of pressure classes in excess of the minimums states in [6.03](#).

SUBSTITUTE:

The installation of mains through areas with environmental contamination, at depths greater than 10-feet, and in the roadways of state and federal highways may require the selection of pressure classes in excess of the minimums states in [6.03](#).

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.04, PAGE 68:

DELETE:

Last paragraph in its entirety.

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.28, PAGE 76:

DELETE:

6.28 CORROSION PROTECTION SYSTEMS

SUBSTITUTE:

6.28 CATHODIC PROTECTION SYSTEMS

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.28, SUBPARAGRAPH A, LAST SENTENCE, PAGE 77:

DELETE:

V-bio enhanced polyethylene wrap may be required for areas where the soil resistivity is 1,000 ohm-centimeters or less.

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.28, PAGE 76:

ADD:

- A. Corrosive soils shall be defined as soils with resistivity measurements less than 5,000 ohm-cm.
- B. In areas where the corrosive soils exist and metallic pipe needs to be used, cathodic protection and V-Bio polyethylene encasement are required. Bond joints with HMWPE insulated stranded copper wire and be in accordance with the Standard Drawings. Exothermic welds shall be covered by an approved weld cap.

Additionally, cathodic protection and V-bio polyethylene encasement are required in the following areas:

1. Landfills or areas adjacent to landfills.
2. An industry or building in that area that cannot be out of water, such as hospitals.
3. High risk repair and difficult access locations including but not limited to arterial roads, interstates, railroad tracks, bridges, and airports.
4. Trenchless installations.

CHAPTER 6 – MATERIALS, SUBPARAGRAPH 6.28, SUBPARAGRAPH C, PAGE 77:

DELETE:

Paragraph in its entirety.

CHAPTER 7 – EARTHWORK, SUBPARAGRAPH 7.10, SUBPARAGRAPH B, PAGE 83:

DELETE:

Bedding and pipe zone material shall be clean, free draining, poorly graded, unfrozen, friable, natural rounded (not crushed) squeegee with no clay balls or organic material that is in accordance with the following limits when tested by means of laboratory sieves:

SUBSTITUTE:

Bedding and pipe zone material shall be clean, free draining, poorly graded, unfrozen, non-friable, natural rounded (not crushed) squeegee with no clay balls or organic material that is in accordance with the following limits when tested by means of laboratory sieves:

CHAPTER 7 – EARTHWORK, SUBPARAGRAPH 7.11, SUBPARAGRAPH B, THIRD PARAGRAPH, SECOND SENTENCE, PAGE 84:

DELETE:

The material shall be placed in 8-inch loose lifts within a range of 2% below the optimum moisture content and compacted to 98% of maximum dry density as determined by ASTM D 698.

SUBSTITUTE:

The material shall be placed in 8-inch loose lifts within a range of 2% above or below the optimum moisture content and compacted to 98% of maximum dry density as determined by ASTM D 698.

CHAPTER 8 – PIPE INSTALLATION, SUBPARAGRAPH 8.06, THIRD PARAGRAPH, LAST SENTENCE, PAGE 88:

DELETE:

The use of pipeline insulation may require additional corrosion protection of pipeline or upgraded protective coatings.

SUBSTITUTE:

The use of pipeline insulation may require additional cathodic protection of pipeline or upgraded protective coatings.

CHAPTER 8 – PIPE INSTALLATION, SUBPARAGRAPH 8.23, PAGE 98:

DELETE:

8.23 CORROSION PROTECTION SYSTEMS

SUBSTITUTE:

8.23 CATHODIC PROTECTION SYSTEMS

CHAPTER 8 – PIPE INSTALLATION, SUBPARAGRAPH 8.23, SUBPARAGRAPH C, FIRST SENTENCE, PAGE 98:

DELETE:

Metallic pipe, joint restraint, fittings, tie rods, and appurtenances shall be polyethylene encased regardless of soil resistivity.

SUBSTITUTE:

Metallic pipe, joint restraint, fittings, tie rods, and appurtenances shall be polyethylene encased regardless of soil corrosivity.

CHAPTER 8 – PIPE INSTALLATION, SUBPARAGRAPH 8.24, FIRST SENTENCE, PAGE 98:

DELETE:

Main extensions and Distributor main extensions shall be disinfected in accordance with AWWA C651 with an NSF 60 certified sodium hypochlorite solution and the requirements of the local health authority having jurisdiction prior to acceptance by Denver Water.

SUBSTITUTE:

Main extensions and Distributor main extensions, with the exception of those in the recycled water system, shall be disinfected in accordance with AWWA C651 with an NSF 60 certified sodium hypochlorite solution and the requirements of the local health authority having jurisdiction prior to acceptance by Denver Water.

CHAPTER 9 – 16-INCH AND 20-INCH TRANSMISSION MAINS, SUBPARAGRAPH 9.03, SUBPARAGRAPH F, PAGE 107:

DELETE:

Mains installed in corrosive soils shall be protected using methods determined by Denver Water. This may consist of the installation of anodes, the bonding of pipe, polyethylene encasement, or other requirements in addition to those in [6.28](#).

SUBSTITUTE:

Mains installed in corrosive soils shall be protected in accordance with [6.28](#).

CHAPTER 9 – 16-INCH AND 20-INCH TRANSMISSION MAINS, SUBPARAGRAPH 9.06, PAGE 107:

DELETE:

Licensee

SUBSTITUTE:

Developer

CHAPTER 10 – 24-INCH AND LARGER, SUBPARAGRAPH 10.05, PAGE 112:

DELETE:

CAD Standards Procedures Manual

SUBSTITUTE:

CAD Standards External Requirements

CHAPTER 11 – RECYCLED WATER SYSTEM, SUBPARAGRAPH 11.02, PAGE 114:

ADD:

- A. The maximum acceptable head loss for 4-inch through 12-inch mains is 5-feet per 1,000 feet. For 16-inch and 20-inch mains, the maximum head loss shall be 3-feet per 1,000 feet. Conduits 24-inch and larger shall have a maximum head loss of 2-feet per 1,000 feet. The head loss criteria for each pipe size range is for a maximum hour flow using a C-value of 130.
- B. Operating pressures within the recycled water distribution system shall be in the range of 40 psi to 150 psi. The maximum pressure fluctuation at any location in the distribution system between maximum hour demand and minimum hour demand shall not exceed 30 psi. The licensee is responsible for installing pressure reducing valves or pumps to control their individual pressure as needed downstream of the meter.

CHAPTER 11 – RECYCLED WATER SYSTEM, SUBPARAGRAPH 11.06, SUBPARAGRAPH B, PAGE 115:

DELETE:

Paragraph in its entirety.

CHAPTER 11 – RECYCLED WATER SYSTEM, SUBPARAGRAPH 11.08, FIRST SENTENCE, PAGE 115:

DELETE:

Customers shall obtain a written Notice of Authorization from CDPHE and/or the appropriate regulatory authorities having jurisdiction prior to obtaining a nonpotable water license for the use of recycled water.

SUBSTITUTE:

Customers must have a written Notice of Authorization from CDPHE and/or the appropriate regulatory authorities having jurisdiction prior to obtaining a nonpotable water license for the use of recycled water.

CHAPTER 11 – RECYCLED WATER SYSTEM, SUBPARAGRAPH 11.16, LAST SENTENCE, PAGE 121:

DELETE:

Dual water supply systems shall also comply with the following additional requirements:

SUBSTITUTE:

Dual water supply systems shall also comply with the following:

CHAPTER 13 – DENVER INTERNATIONAL AIRPORT (DEN), PAGE 125:

ADD:

New chapter in its entirety.

The following Material Specifications are hereby corrected and updated:

MATERIAL SPECIFICATION – 1 for Ductile Iron Pipe, Subparagraph 6, Page 1:

DELETE:

60/42/10

SUBSTITUTE:

60-42-10

MATERIAL SPECIFICATION – 5 for Resilient Seated Gate Valves, Subparagraph 2, Second Sentence, Page 1:

DELETE:

Valves shall operate with flows in either direction and shall provide zero leakage past the seat; the operating pressure for all sizes shall be 200 psi.

SUBSTITUTE:

Valves shall operate with flows in either direction and shall provide zero leakage past the seat; the operating pressure for 3-inch through 12-inch shall be 200 psi and 14-inch through 20-inch shall be 150 psi.

MATERIAL SPECIFICATION – 5 for Resilient Seated Gate Valves, Subparagraph 3, Page 1:

DELETE:

150 pound class

MATERIAL SPECIFICATION – 5 for Resilient Seated Gate Valves, Subparagraph 4, Last Sentence, Page 1:

ADD:

Valves installed in the recycled water system shall have EPDM seats.

MATERIAL SPECIFICATION – 8 for Tapping Valves – Mechanical Joint Type, Subparagraph 4, Last Sentence, Page 1:

ADD:

Valves installed in the recycled water system shall have EPDM seats.

MATERIAL SPECIFICATION – 11 for Combination Air-Release and Vacuum Valves, Subparagraph 6, Subparagraph C, Last Sentence, Page 1:

ADD:

Valves installed in the recycled water system shall have EPDM seats.

MATERIAL SPECIFICATION – 19 for Magnetic Drive Turbine Type Fire Service Water Meters, Subparagraph 9, Page 1:

DELETE:

C550

SUBSTITUTE:

C116

MATERIAL SPECIFICATION – 20 for Normal Weight and Precast Concrete, Subparagraph 2, Page 1:

DELETE:

A minimum of 10 days prior to beginning concrete work, concrete mix designs in accordance with ACI 301 shall be submitted for approval by Denver Water. Changes shall not be made in the amounts or sources of the approved mix ingredients without Denver Water's written approval. Production inspection and field testing of the approved mix may be made by Denver Water.

SUBSTITUTE:

A minimum of 14 days prior to beginning concrete work, concrete mix designs in accordance with ACI 301 shall be submitted for approval by Denver Water. Submittals shall include data sheets demonstrating that all mix components meet the requirements outlined in this specification. Mix design shall be signed and sealed by the PE and include historical compressive strength test results. Changes shall not be made in the amounts or sources of the approved mix ingredients without Denver Water's written approval. A Certified independent testing firm, hired by the contractor, shall take samples for testing at a minimum from the first concrete truck and every 50 cubic yards thereafter for each mix on each day. Production inspection and field testing of the approved mix may be made by Denver Water.

MATERIAL SPECIFICATION – 20 for Normal Weight and Precast Concrete, Subparagraph 3, Subparagraph B, Subparagraph 3, Page 1:

DELETE:

If the aggregates used are known to be reactive with high alkali cement in accordance with ASTM C 295 or if the reactivity of the aggregate is not known, the use of low alkali cement is required to ensure adequate protection from alkali-aggregate reaction.

SUBSTITUTE:

Aggregates shall be tested for alkali reactivity in accordance with ASTM C 1260. A maximum of 0.10% expansion at 14 days is permitted for aggregate product used in Portland cement concrete.

MATERIAL SPECIFICATION – 20 for Normal Weight and Precast Concrete, Subparagraph 4, Subparagraph A, First Sentence, Page 2:

DELETE:

4,000 psi

SUBSTITUTE:

4,500 psi

MATERIAL SPECIFICATION – 20 for Normal Weight and Precast Concrete, Subparagraph 4, Third Paragraph, First Sentence, Page 2:

DELETE:

Concrete shall be air-entrained to a total air content of 5% plus 2% or minus 1% of the volume of the batch.

SUBSTITUTE:

Concrete shall be air-entrained to a total air content of 5% to 8% of the volume of the batch.

MATERIAL SPECIFICATION – 20 for Normal Weight and Precast Concrete, Subparagraph 4, Fourth Paragraph, Page 2:

ADD:

The maximum ratio of water to cementitious material shall be 0.45.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 2, First Sentence, Page 1:

DELETE:

2 days

SUBSTITUTE:

14 days

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 2, Second Sentence, Page 1:

ADD:

Submittals shall include data sheets demonstrating that all mix components meet the requirements outlined in this specification. Mix design shall be signed and sealed by the PE and include historical compressive strength test results.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 3, Subparagraph A, Page 1:

DELETE:

Subparagraphs 4, 5, 6, and 7 in their entirety.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 3, Subparagraph A, Subparagraph 4, Page 1:

DELETE:

Aggregates shall not exceed 0.10% expansion at 14 days when tested for alkali reactivity per ASTM C 1260.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 3, Subparagraph C, Subparagraph 4, Page 1:

DELETE:

Removability modulus of 1.5.

SUBSTITUTE:

Maximum removability modulus of 1.5.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 4, Subparagraph A, Subparagraph 2, Page 2:

ADD:

Flash fill shall not be placed in contact with PVC due to heat of hydration. A minimum of 6-inches of pipe zone material is required between PVC and flash fill.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 4, Subparagraph B, Page 2:

DELETE:

Subparagraphs 3, 4, and 5 in their entirety.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 4, Subparagraph B, Subparagraph 1, Page 2:

ADD:

Minimum slump shall be 8-inches.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 4, Subparagraph B, Subparagraph 2, Page 2:

DELETE:

Unconfined compressive strength at 28 days shall be 50 to 150 psi when molded and cured in accordance with ASTM D 4832.

SUBSTITUTE:

Unconfined compressive strength at 24 hours shall be at least 150 psi when molded and cured in accordance with ASTM D 4832.

MATERIAL SPECIFICATION – 21 for Controlled Low Strength Backfill Material, Subparagraph 4, Subparagraph C, Subparagraph 2, Page 2:

DELETE:

50 psi to 150 psi

SUBSTITUTE:

100 psi to 300 psi

MATERIAL SPECIFICATION – 38 for Resilient Seated Insertion Valves, Subparagraph 2, Page 1:

DELETE:

Use of these valves on AC pipe is prohibited. Valves shall be suitable for frequent operation and for long periods of inactivity. Valves shall operate with flows in either direction and shall provide zero

leakage past the seat; minimum working pressure for all sizes shall be 250 psi. Components shall be suitable for exposure to chloraminated water.

SUBSTITUTE:

Valves shall be suitable for frequent operation and for long periods of inactivity. Valves shall operate with flows in either direction and shall provide zero leakage past the seat; minimum working pressure for all sizes shall be 250 psi. Components shall be suitable for exposure to chloraminated water. Use of these valves on AC pipe is prohibited.

MATERIAL SPECIFICATION – 38 for Resilient Seated Insertion Valves, Subparagraph 6, Page 1:

DELETE:

6. VALVE STEMS

SUBSTITUTE:

6. VALVE STEMS AND SEAT

MATERIAL SPECIFICATION – 38 for Resilient Seated Insertion Valves, Subparagraph 6, Second Paragraph, Page 1:

ADD:

Valve seat shall be synthetic rubber, Buna-N or EPDM. Valves installed in the recycled water system shall have EPDM seats.

MATERIAL SPECIFICATION – 38 for Resilient Seated Insertion Valves, Subparagraph 11, Second Sentence, Page 2:

DELETE:

8-mils

SUBSTITUTE:

10-mils

The following Standard Drawings are hereby corrected and updated:

1. **STANDARD DRAWINGS TABLE OF CONTENTS, PAGE 2:**

DELETE: Ductile Iron Pipe Joint Bonding

SUBSTITUTE: Metallic Pipe Joint Bonding

2. **STANDARD DRAWINGS TABLE OF CONTENTS, PAGE 2:**

ADD: Denver International Airport Airside Fire Hydrant Assembly

3. **STANDARD DRAWINGS TABLE OF CONTENTS, PAGE 2:**
ADD: Anode Installation
4. **STANDARD DRAWINGS TABLE OF CONTENTS, PAGE 2:**
ADD: Manhole Ring and Cover Over Meter Pit
5. **SHEET 5 – TYPICAL PRIVATE STREET SECTION**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
6. **SHEET 10 – PLAN, PROFILE, & LOCATION FOR FIRE HYDRANTS, MAINS, & VALVES**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
7. **SHEET 18 – CONCRETE KICKBLOCKS BEARING SURFACES & INSTALLATION**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
8. **SHEET 46 – GENERAL METER & SERVICE NOTES**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
9. **SHEET 47 - 3" & LARGER DOMESTIC & FIRELINE CONNECTIONS**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
10. **SHEET 53 – MANIFOLD SERVICE LINE WITH INDIVIDUAL METER PITS**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
11. **SHEET 54 – MANIFOLD SERVICE LINE WITH SHARED ACCESS**
DELETE: Drawing in its entirety.
SUBSTITUTE: Attached drawing.
12. **SHEET 55 – OUTSIDE SETTING FOR 3/4" & 1" METER**
DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

13. **SHEET 56 – OUTSIDE SETTING FOR 1 1/2" & 2" METER WITH CHECK VALVE & BYPASS IN MANHOLE**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

14. **SHEET 57 – LARGE METER IN VAULT**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

15. **SHEET 58 – LARGE METER IN VAULT (IRRIGATION SERVICE ONLY)**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

16. **SHEET 59 – INSIDE SETTING FOR EXISTING 3/4" & 1" METER WITH AMR**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

17. **SHEET 60 – INSIDE SETTING FOR 1 1/2" & 2" METER & BYPASS WITH INSIDE BACKFLOW PREVENTION ASSEMBLY**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

18. **SHEET 61 – INSIDE SETTING FOR 3" AND LARGER METER**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

19. **SHEET 72 – STANDARD HYDRANT METER INSTALLATION**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

20. **SHEET 81 – METALLIC PIPE JOINT BONDING**

DELETE: Drawing in its entirety.

SUBSTITUTE: Attached drawing.

21. **SHEET 87 – DENVER INTERNATIONAL AIRPORT AIRSIDE FIRE HYDRANT ASSEMBLY**

ADD: Attached drawing.

22. **SHEET 88 – ANODE INSTALLATION**

ADD: Attached drawing.

23. **SHEET 89 – MANHOLE RING AND COVER OVER METER PIT**

ADD: Attached drawing.

Appendix I: Procedure for Evaluation of Materials, Subparagraph 3, First Sentence, Page 1:

DELETE:

The MRC will consider the product based upon their collective experience and opinions.

SUBSTITUTE:

The MRC will consider all products based upon their collective experience and opinions and objective data in their sole discretion.

Appendix I: Procedure for Evaluation of Materials, Subparagraph 6, First Sentence, Page 2:

DELETE:

If the product is rejected and if the Manufacturer's Representative has reason to petition the evaluation, then he or she may appeal in writing to the Director of Engineering – Projects.

SUBSTITUTE:

If the product is rejected and if the Manufacturer's Representative has reason to petition the evaluation, or if a Manufacturer or product is excluded from an approved products list, then he or she may appeal in writing to the Director of Engineering – Projects.

Appendix I: Procedure for Evaluation of Materials, Subparagraph 6, Last Sentence, Page 2:

DELETE:

If the MRC does not find sufficient cause to investigate the matter further, they will so advise the Product or Material Representative in writing and that decision shall be final.

SUBSTITUTE:

If the MRC does not find sufficient cause to investigate the matter further, they will so advise the Product or Material Representative in writing and that decision shall be the final decision of Denver Water on the matter.

The administration of these Standards, including the interpretation, enforcement, revision, waiver, and variance thereof, is hereby delegated by the CEO/Manager to the Chief Engineering Officer or the Chief's appointed representative. A variance request must be submitted to the Sales Administration Section and forwarded to the Chief Engineering Officer, or the Chief's appointed representative, for review.

A PDF version of the Errata 2 revisions can be found at:

[https://www.denverwater.org/contractors/construction-information/design-standards/engineering-standards\](https://www.denverwater.org/contractors/construction-information/design-standards/engineering-standards)

Please contact Katie Ross at 303-628-6589 with any questions regarding these changes.

End of Memorandum