Kearns Improvement District

5350 WEST 5400 SOUTH
TEL: (801) 968-1011 • FAX: (801) 968-1023

December 17, 2020

Heather Pattee
State of Utah Division of Drinking Water
Financial Assistance Program
195 North 1950 West
Salt Lake City, UT 84116

Subject: American Iron and Steel Availability-Based Waiver Request on Double Eccentric Butterfly Valves

Dear Ms. Pattee:

Kearns Improvement District (KID) is requesting an availability-based project-specific waiver pursuant to the American Iron and Steel (AIS) requirements for the purchase of double eccentric butterfly valves for the 6200 South Zone C Pump Station Project. KID is in the process of requesting bids from contractors to construct a new pump station that will use Jordan Valley Water Conservancy District (JVWCD) provided water and pump that water to KID owned storage facilities. Because the connection to JVWCD will be owned and maintained by JVWCD after construction, the facilities must meet JVWCD specifications.

JVWCD requires the use of double eccentric butterfly valves to provide effective water shutoff for valves that act as major conveyance facilities that are rarely closed or exercised. KID reached out to JVWCD to determine if an AIS compliant valve would meet their shutoff requirements. JVWCD responded that there are no AIS compliant valves that currently meet their specifications and provided two manufacturers that provide double eccentric valves that meet their specifications: VAG, and AV-TEK.

The following documents describe the project and the requested waiver items.

Sincerely,
Greg Anderson, PE

Public Works Direction / District Engineer

Attachments

This waiver request was submitted to the EPA by the state of Utah. All supporting correspondence and/or documentation from contractors, suppliers or manufacturers included as a part of this waiver request was done so by the recipient to provide an appropriate level of detail and context for the submission. There may be documents with project diagrams, schedules, and supplier correspondence in formats that do not meet the Federal accessibility requirements for publication on the Agency's website. Hence, these exhibits have been omitted from this waiver publication. They are available upon request by emailing DWSRFWaiver@epa.gov.

AIS WAIVER REQUEST FOR DOUBLE OFFSET BUTTERFLY VALVES

OWNER

Kearns Improvement District (KID) operates a water distribution and sewer collection system for the Kearns Metro Township and adjacent areas that are part of unincorporated Salt Lake County, and in limited cases part of West Jordan City or West Valley City.

PROJECT NAME

6200 South Zone C Pump Station.

PROJECT DESCRIPTION

With expected development in the District's upper pressure zones, it is projected that future demands will shortly exceed the capacity of existing District pumping facilities. Thus, the District has identified a need for a new pump station to deliver source water from Jordan Valley Water Conservancy District (JVWCD) to its Zone C storage tank. Zones D and E will subsequently receive water pumped from the District's Zone C tank to existing or future Zone D and E storage tanks. The new 6200 South Pump Station will add 10,400 gpm of capacity to its Zone C, D, and E pressure zones.

PROJECT LOCATION

The proposed location of the new pump station is 6200 South and 5211 West as shown in Figure 1. This is the same location as an existing District pump station that pumps to Zones A, B, and C as indicated in Figure 2. The intent of the project would be to leave the existing pump station in place while adding a second pump station with additional pumping capacity to Zone C. This location is desirable because it is located adjacent to an existing JVWCD tank, which provides a readily available source for the pump station.

Figure 2
Existing Project Site

DESCRIPTION OF THE FOREIGN AND DOMESTIC CONSTRUCTION MATERIALS

The plans and specifications require new isolation valves ranging in size from 12-inch to 30-inch. The 11 valves included in the pump station and associated isolation valve vaults are constructed of ductile iron bodies, with stainless steel and bronze components, and must be designed to withstand high velocities. They must also be designed to remain in the open position for long durations without compressing the valve seal. This helps the valve remain water right after years of operation without being exercised. Double offset butterfly valves are produced internationally; there are no domestic manufacturers that can meet the required specifications within the United States.

UNIT OF MEASURE

The valves listed above are measured by "each."

QUANTITY

A total of 11 double offset butterfly valves listed in the table below.

PRICE

The prices below were provided by Rocky Mountain Valve. There may be small differences in the final cost depending on results of the upcoming bid on January 20, 2021.

Double Offset Butterfly Valves			
Size (inch)	Quantity	Unit Price (each)	Total Cost
12	4	[redacted]	[redacted]
18	4	[redacted]	[redacted]
20	1	[redacted]	[redacted]
30	2	[redacted]	[redacted]
Total	11		[redacted]

*valve supplier purchase and delivery cost only

TIME OF DELIVERY AND AVAILABILITY

Delivery time of the double offset valves is not applicable to this waiver. However, double offset valves that meet the required specifications are not fabricated domestically in the United States.

For similar projects, the EPA conducted market research on the supply and availability of double offset butterfly valves and concluded that there are no domestic manufacturers of these valves that meet the technical specifications of those projects (similar to the 6200 South Zone C Pump Station Project). There are domestic manufacturers capable of providing double offset butterfly valves in the sizes required for the project, but these manufacturers cannot provide valves that meet the 100 percent leak proof requirement and/or a product that meets the AWWA C504 Standard for high velocity as specified.

LOCATION OF THE CONSTRUCTION PROJECT

This project is located in Salt Lake County, Utah as described in Figure 1.

NAME AND ADDRESS OF THE PROPOSED SUPPLIERS

Because this project is still in the bidding phase of construction, the supplier of the valve is not finalized; but is expected to come from one of the following:

Rocky Mountain Valve
1310 South Swaner Road
Salt Lake City, UT 84104

Ferguson
2565 S 300 W
Salt Lake City, UT 84115

DETAILED JUSTIFICATION FOR THE USE OF FOREIGN CONSTRUCITON MATERIALS

JVWCD, the water supplier who will eventually own and operate the key connection piping, requires the use of double eccentric butterfly valves to provide effective water shutoff for valves that act as major conveyance facilities. KID reached out to JVWCD to determine if an AIS compliant valve would meet their shutoff requirements. JVWCD responded that there are no AIS compliant valves that currently meet their specifications and provided two manufacturers that provide double eccentric valves that meet their specifications: VAG, and AV-TEK. Because KID is required to meet JVWCD specifications, there are limited options KID has to use regarding alternate valve types.

The double offset butterfly valves, discussed above, are not manufactured domestically in the United States. The purpose of the double offset butterfly valves for the 6200 South Zone C Pump Station is to provide isolation and shut-off service so that JVWCD storage facilities and the KID Pump Station can be maintained. It is essential that the butterfly valves not leak. Many of these valves are located below grade in limited access confined space vaults. The vaults must remain dry since they contain power cables and electronic devices, especially when KID or JVWCD personnel are present and conducting maintenance activities. The double offset design ensures a 100 percent leak-free valve by preventing the elastomeric seal from being compressed by the disc when the valve is in the open position. The compression set or permanent indentation(s) of the elastomeric seal on single offset or zero offset valves could become a leak path.

The project's technical specifications also require that the valves comply with the American Water Works Association C504 Standard, meaning that the valves must allow a maximum velocity of 16 feet per second. In addition, the project's technical specifications require the butterfly valves to have a high velocity elastomeric seal, which is rated to over 300 feet per second, because very high localized velocities could be produced when the valve is being closed. KID and their engineer (Bowen Collins & Associates) found no domestically manufactured double offset butterfly valves that meet this velocity criterion. These valves are required and specified to isolate the proposed pump station from JVWCD and from KID major conveyance facilities. This is necessary for maintenance. The double offset butterfly valves provide improved performance over other types of valves and withstand leaking pressures. For these reasons, the JVWCD and KID requires double offset butterfly valves for use on the 6200 South Zone C Pump Station Project.

SUPPLIER INFORMATION OR PRICING INFORMATION FROM A REASONABLE NUMBER OF DOMESTIC SUPPLIERS INDICATED AVAILABILITY / DELIVERY DATE FOR CONSTRUCITON MATERIALS

The double offset butterfly valves are not manufactured domestically in the United States. There are no domestically manufactured replacement valves that would meet the specifications for the 6200 South Zone C Pump Station Project. For similar projects, the EPA conducted market research on the supply and availability of double offset butterfly valves and concluded that there are no domestic manufacturers of these valves that meet the technical specifications of those projects (similar to the 6200 South Zone C Pump Station specifications). There are domestic manufacturers capable of providing double offset butterfly valves in the sizes required for the project but these manufactures cannot provide valves that meet the 100 percent leak proof requirement and/or a product that meets the AWWA C504 Standard for high velocity design as specified.

DOCUMENTATION OF THE ASSISTANCE RECIPIENT'S EFFORTS TO FIND AVAILABLE DOMESTIC SOURCES, SUCH AS DESCRIPTION OF THE PROCESS FOR IDENTIFYING SUPPLIERS AND A LIST OF CONTACTED SUPPLIERS

This project is still in the bidding phase of construction. As a result, KID requested that their engineer, Bowen, Collins & Associates, contact domestic suppliers of valves to determine if any double offset valves meet specifications or equal requirements. BC&A indicated that there are no domestic suppliers for the double offset butterfly valves that meet the project plans and specifications. Valmatic is reportedly developing a double offset valve that will meet project specification that may be released in late 2021, but this is not guaranteed and will not meet the project schedule.

PROJECT SCHEDULE

This project is still in the bidding phase for construction, so the schedule is currently limited to key milestones.

January 20, 2021 – Contractor Bids Due
February 10, 2021 – Anticipated Notice to Proceed
April 15, 2022 – Substantial Completion
May 20, 2022 – Final Completion

April 15 through October 15 – No connections to existing JVWCD and KID pipeline permitted.

RELEVANT EXCERPTS FROM PROJECT

Key drawings and specifications are attached.

BOWEN COLLINS & ASSOCIATES

154 EAST 14075 SOUTH • DRAPER, UTAH 84020
TEL: (801) 495-2224 • FAX: (801) 495-2225

December 17, 2020

Greg Anderson, P.E.
Public Works Director / District Engineer
5350 West 5400 South
Kearns, UT 84118

Re: 6200 South Zone C Pump Station
Subject: AIS Waiver Contractor Statement

Dear Greg:

The intention of this letter is to inform Kearns Improvement District that the following permanent construction materials specified for the construction of the 6200 South Zone C Pump Station are not available from domestic suppliers.

Bowen, Collins & Associates, in an effort to meet the AIS requirements, has requested pricing for domestically produced double offset valves per specification 40 05 64 from the following suppliers: Core and Main, HD Fowler, and Waterford Systems. The suppliers have stated that the specified valves are not available from a domestic manufacturing source. The only manufacturers that currently produce the specified double eccentric butterfly valve are VAG and AV-TEK.

Sincerely,
Bowen Collins & Associates, Inc.

Andrew T. McKinnon, P.E.
Project Engineer

SECTION 40 05 51
VALVES, GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall provide valves, actuators, and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The requirements of Section 11 00 00 - Equipment General Provisions, apply to the Work of this Section.

C. The provisions of this Section shall apply to all valves and valve actuators except where otherwise indicated. Valves and actuators in particular locations may require a combination of units, sensors, limit switches, and controls indicated in other Sections of the Specifications.

D. Where a valve is to be supported by means other than the piping to which it is attached, the Contractor shall obtain from the valve manufacturer a design for support and foundation that satisfies the criteria in Section 11 00 00. The design, including drawings and calculations sealed by an engineer, shall be submitted with the Shop Drawings. When the design is approved, the support shall be provided.

E. Unit Responsibility: A single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve; however, the Contractor shall be responsible to the Owner for compliance with the requirements of each valve section. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve.

F. Single Manufacturer: Where two or more valves of the same type and size are required, the valves shall be furnished by the same manufacturer.

1.2 SUBMITTAL PROCEDURES

A. Furnish submittals in accordance with Section 01 33 20 - Submittal Procedures

B. Shop Drawings: Shop Drawings shall contain the following information:
   1. Valve name, size, Cv factor, pressure rating, identification number (if any), and specification section number.
   2. Complete information on valve actuator, including size, manufacturer, model number, limit switches, and mounting.
   3. Cavitation limits for control valves.
   4. Assembly drawings showing part nomenclature, materials, dimensions, weights, and relationships of valve handles, handwheels, position indicators, limit switches, integral control systems, needle valves, and control systems.
   5. Data in accordance with Section 26 19 00 – Medium-Voltage Induction Motors for electric motor-actuated valves.
   6. Complete wiring diagrams and control system schematics.
   7. Valve Labeling: A schedule of valves to be furnished with stainless steel tags, indicating in each case the valve location and the proposed wording for the label.

C. Technical Manual: The Technical Manual shall contain the required information for each valve.

D. Spare Parts List: A Spare Parts List shall contain the required information for each valve assembly, where indicated.

E. Factory Test Data: Where indicated, signed, dated, and certified factory test data for each valve requiring certification shall be submitted before shipment of the valve. The data shall also include certification of quality and test results for factory-applied coatings.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. General: Valves and gates shall be new and of current manufacture. Shut-off valves 6-inches and larger shall have actuators with position indicators. Gate valves 18-inches and larger or where chain wheel is required, shall be furnished with spur gear and hand wheel. Buried valves shall be provided with valve boxes and covers containing position indicators and valve extensions. Manual shut-off valves mounted higher than 7-feet above working level shall be provided with chain actuators.

B. Valve Actuators: Unless otherwise indicated, valve actuators shall be in accordance with Section 40 05 57 - Valve and Gate Actuators.

C. Protective Coating: The exterior surfaces of all valves and the wet interior surfaces of ferrous valves of sizes 4-inches and larger shall be coated in accordance with Section 09 90 00 – Protective Coatings. The valve manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment, in accordance with these Specifications. Flange faces of valves shall not be epoxy coated.

D. Valve Labeling: Except when such requirement is waived by the construction manager in writing, a label shall be provided on shut-off valves and control valves except for hose bibbs and chlorine cylinder valves. The label shall be of 1/16-inch plastic or stainless steel, minimum 2-inches by 4-inches in size, and shall be permanently attached to the valve or on the wall adjacent to the valve as directed by the construction manager.

E. Valve Testing: As a minimum, unless otherwise indicated or recommended by the reference Standards, valves 3-inches in diameter and smaller shall be tested in accordance with manufacturer's standard and 4-inches in diameter and larger shall be factory tested as follows:

1. Hydrostatic Testing: Valve bodies shall be subjected to internal hydrostatic pressure equivalent to twice the water rated pressure of the valve. Metallic valves rating pressures shall be at 100 degrees F and plastic valves shall be 73 degrees, or at higher temperature according to type of material. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed. The duration shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes.
2. Seat Testing: Valves shall be tested for leaks in the closed position with the pressure differential across the seat equal to the water rated pressure of the valve. The

duration of test shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes. Leakage past the closed valve shall not exceed 1 fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.

3. Performance Testing: Valves shall be shop operated from fully closed to fully open position and reverse under no-flow conditions in order to demonstrate the valve assembly operates properly.

F. Certification: Prior to shipment, the Contractor shall submit for valves over 12-inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.

G. Valve Marking: Valve bodies shall be permanently marked in accordance with MSS SP25 - Standard Marking Systems for Valves, Fittings, Flanges, and Unions.

2.2 MATERIALS

A. General: Materials shall be suitable for the intended application. Materials in contact with potable water shall be listed as compliant with NSF Standard 61. Materials not indicated shall be high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Unless otherwise indicated, valve and actuator bodies shall conform to the following requirements:

1. Cast Iron: Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
2. Ductile Iron: ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
3. Steel: ASTM A 216 - Steel Castings, Carbon Suitable for Fusion Welding for High-Temperature Service, or to ASTM A 515 - Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.
4. Bronze: ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.
5. Stainless Steel: Stainless steel valve and operator bodies and trim shall conform to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or shall be Type 316 stainless steel.
6. PVC: Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 12454.
7. CPVC: Chlorinated Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 23447.
8. NSF Standard 14: Materials shall be listed for use in contact with potable water.

2.3 VALVE CONSTRUCTION

A. Bodies: Valve bodies shall be cast, molded (in the case of plastic valves), forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Welds on welded bodies shall be done by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum temperature and pressure to which the valve will be subjected.

B. Valve End Connections: Unless otherwise indicated, valves 2-1/2 inches diameter and smaller may be provided with threaded end connections. Valves 3-inches and larger shall have flanged end connections.

C. Bonnets: Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.

D. Stems: Valve stems shall be of the materials indicated, or, if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Bronze valve stems shall conform to ASTM B 584, except that zinc content shall not exceed 16 percent.

E. Stem Guides: Stem guides shall be provided, spaced 10-feet on centers unless the manufacturer can demonstrate by calculation that a different spacing is acceptable. Submerged stem guides shall be 304 stainless steel.

F. Internal Parts: Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.

G. Nuts and Bolts: Nuts and bolts on valve flanges and supports shall be in accordance with Section 05 50 00 – Metal Fabrications.

2.4 VALVE ACCESSORIES

A. Valves shall be furnished complete with the accessories required to provide a functional system.

2.5 SPARE PARTS

A. The Contractor shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The Contractor shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. Spare parts are intended for use by the Owner, after expiration of the correction of defects period.

2.6 MANUFACTURERS

A. Manufacturer's Qualifications: Valve manufacturers shall have a successful record of not less than 5 years in the manufacture of the valves indicated.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

A. General: Valves, actuating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written instructions and as indicated. Gates

shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe.

B. Access: Valves shall be installed with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment.

C. Valve Accessories: Where combinations of valves, sensors, switches, and controls are indicated, the Contractor shall properly assemble and install such items so that systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on Shop Drawing submittals.

END OF SECTION

THIS PAGE INTENTIONALLY BLANK

SECTION 40 05 64
BUTTERFLY VALVES

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor shall provide butterfly valves and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The requirements of Section 11 00 00 – Equipment General Provisions apply to this Section.

C. The requirements of Section 40 05 51 - Valves, General apply to this Section.

D. The requirements of Section 40 05 57 - Valve and Gate Actuators apply to this Section.

1.2 CONTRACTOR SUBMITTALS

E. Furnish submittals in accordance with Section 40 05 51 – Valves, General.

F. Shop Drawings

1. Complete Shop Drawings of butterfly valves and actuators.
2. Drawings showing valve port diameter complete with dimensions, part numbers, and materials of construction.
3. Certification of proof-of-design test from the valve manufacturer.
4. Certification: The Contractor shall obtain written certification from the butterfly valve manufacturer, addressed to the Owner, stating that the butterfly valves and the valve operators will efficiently and thoroughly perform the required functions in accordance with these Specifications and as shown, and that the manufacturer accepts joint responsibility with the Contractor for coordination of all butterfly valves and valve operators, including motors, drives, controls, and services required for proper installation and operation of the completely assembled and installed units. The Contractor shall submit all such certificates to the construction manager.
5. Technical Manuals: The Contractor shall furnish technical manuals for the butterfly valves, manual operators, and electric motor valve operators under one cover and in accordance with the requirements of Section 01 33 20 – Submittal Procedures.
6. Valve Labeling: The Contractor shall submit a schedule of butterfly valves to be labeled indicating in each case the valve location and the proposed wording for the label.
7. Field Procedures: Written instructions for field procedures for erection, adjustments, inspection, and testing shall be provided prior to delivery of the butterfly valves and valve operators.

1.3 QUALITY ASSURANCE

G. Valves shall be subjected to performance, leakage, and hydrostatic tests in accordance with procedures and acceptance criteria established by AWWA C504.

PART 2 - PRODUCTS

2.1 BUTTERFLY VALVES 4-INCH AND LARGER – CLASS 150B AND 250B

A. General: The butterfly valve shall be designed expressly for waterworks applications and shall be of the double offset design whereby the elastomeric seal is not compressed with the valve in the open position. Zero, single and API based triple offset butterfly valve designs are not acceptable. Butterfly valves for water working pressures up to 150 psi shall conform to ANSI/AWWA C504 Class 150B. Butterfly valves for water working pressures greater than 150 psi shall conform to the design requirements of ANSI/AWWA C-504, Class 250B. Valves shall be of the size and class indicated in the valve schedule or in the plans. All valves unless noted otherwise, shall be sized for bi-directional water service, full rated pressure and a line velocity of 16 feet per second and suitable for higher linebreak velocities of 50 fps. Lifting lugs will be provided for all valves 24" and larger.

B. Flanges: Class 150B flanged valves shall have ANSI B16.1 Class 125-pound flanges. Class 250B flanged valves shall comply with ANSI B16.1 Class 250 up through 48-inch unless otherwise noted or if mating to ductile iron pipe. Above 48-inch, flange outside diameter, number of bolts, diameter of bolt circle, and diameter of bolts shall comply with ANSI/AWWA C 207 Class E.

C. Body: Valve bodies shall be ductile iron, ASTM A536 65-45-12 or A536 60-40-18. Cast gray iron is not allowed due to near zero elongation and as it vulnerable to shear stress. The valve body shall include integrally cast support feet top and bottom. It shall be mechanically equipped with a fastened stainless steel stamped or engraved tag indicating manufacturer and reference build data. Valves 54 inch and larger shall include two tags diametrically opposed. The valve build data shall be made available upon request by the customer and shall be retained by the manufacturer for no less than 70 years unless noted longer. The entire valve body and flanges shall be epoxy corrosion coat protected except for the valve shaft bores.

D. Disc: The disc shall be ductile iron ASTM A536 65-45-12 or ASTM A536 60-40-18. The entire disc and all its wetted surfaces shall be coated without exception. The disc's elastomeric seal retainer shall be type 304, duplex 2205 or 316 stainless steel. Neither bronze nor carbon steel is acceptable. Both the disc and elastomeric seal retainer shall have recesses designed to retain a dual shouldered seal under extreme localized velocities, at full differential opening and/or linebreak closing. The disc shall be mechanically fastened to the valve shaft by using Polygon "no fail" connection or equivalent stainless steel key connection or the disc shall be mechanically fastened to the valve shaft using tangential stainless steel shaft pins of type 316 or higher alloy. Disc pins shall extend completely through the valve and shall be mechanically fastened. The disc shall be completely coated except for the

disc shaft bores.

E. Shaft: Valve shafts shall be dual stub shafts of stainless steel ASTM A276 Type 316, 304, 431, duplex 2205,or 420. The valve shaft material and thickness shall be suitable for the applications pressure and velocity without the use of its safety factors. Shafts may not be turned down to fit drive splines without accompanying torsional strength reduction calculations and its effect on the safety factor.

F. Elastomeric Seal and Seal Ring: Valve seals shall be EPDM, secured to a completely coated valve disc by a duplex 2205, 304 or 316 stainless steel, continuous non-segmented seal ring and secured by 316 stainless steel fasteners. The seal shall not scallop, cold flow or tear at localized velocities less than 300 fps. The elastomeric seal shall not be penetrated by fasteners. The valve shall be bi-directionally leak free. The elastomeric seal shall be double shouldered and extend no greater than 0.25 inches past the disc edge to seat the valve. The seal shall be designed to flex in either flow direction. There shall be a small gap on both sides of seal which will allow for pipeline pressurized media to further expand the seal against the metallic seat- the higher the differential pressure or velocity. The elastomeric seal shall be field replaceable and adjustable in line. It shall not require special skills or tools to replace the seat. With access to the seat retaining bolts, the seat removal, replacement and readiness for service must be able to be accomplished in a maximum of 3 hours for all size valves. Seat methods which do not comply or use either irreplaceable vulcanized seals or which use hardened epoxy or grout in a dovetailed groove are not acceptable.

G. Metallic Seat: The metallic valve seat shall be located in the valve body. It shall be a highly wear resistant stainless steel alloy. There shall be no gap between the valve body and metallic body seat and consequently no potential for corrosion or lifting of the seat. The seat shall be applied through a high alloy weld overlay process. Metallic seats shall not be mechanically retained by fasteners.

H. Shaft Seals: Shaft seals shall not need periodic manual adjustment. They shall be multi-O-ring seals protecting both the OD and ID of the shaft bearings. They shall prevent pressurized system water from entering the uncoated valve disc hub and valve body shaft bore. The valve shaft shall remain non-wetted and unpressurized. The non-wetted shaft shall allow the actuator to be removed without dewatering the pipeline. It shall prevent debris and system pressurized water from entering into the uncoated valve body shaft bore. It shall prevent waters or contaminated media, external to the valve, from entering through the valve shaft under vacuum/ negative pressure conditions in the pipeline, or hydrostatic pressure conditions external to the valve. Neither manual pulldown packing glands nor braided packing are allowed. The outer shaft seals shall be a replaceable cartridge type, bolted to the valve body. Packing shall not be held in place with an adapter plate or by the valve actuator.

I. Shaft Bearings: Valve shaft bearings shall be corrosion resistant, self-lubricating sleeve type made of bronze, stainless steel or stainless steel backed PTFE. Bearing choice and consequent bearing friction shall be correctly added to valve input torque requirements.

J. Strength: The proportion and dimensions of all parts of the valve and actuator shall be designed to withstand, without failure, the stresses occurring under the testing and operating conditions. The maximum allowable stress in any material shall not exceed 1/5 of the ultimate tensile strength or 1/3 of the minimum yield strength. Class 150B valves shall be rated to and shall receive a pressure test of 150 psi and Class 250B valves shall be rated to and shall receive a pressure test of 250 psi applied to one side of the disc with zero pressure applied to the other side of the disc while in the closed position, without damage or permanent deformation to any part of the valve, seat, disc or shaft. The valve shall be capable of withstanding such pressures in both directions.

K. Manual Actuators: Actuators shall conform to Section 40 05 57 – Valve and Gate Actuators and to ANSI/AWWA C 540, subject to the following requirements. All actuators shall be self-locking and shall hold the valve disc in the closed, open and any intermediate position without creeping or fluttering. All actuators shall incorporate a mechanical stop-limiting device to prevent over travel of the disc. Unless direct buried or otherwise indicated, all manually actuated butterfly valves shall be equipped with a handwheel and external position indicator. The number of turns for direct buried valves shall be a minimum of 1.4 times the nominal valve size with no fewer than 25 turns. The valve manufacturer shall be responsible for mounting and testing the actuator. Screw-type (traveling nut) actuators are not permitted due to their inconsistent output torques through the 90-degree stroke. All manual direct buried service actuators shall be designed for a 300 foot-pound input torque against the closed and open travel stops. The Owner reserves the right to field verify.

L. Worm-Gear Actuators: All valves including submerged and buried valves, shall be equipped with top tier AWWA worm-gear actuators, lubricated and sealed to prevent entry of dirt or water into the housing. Buried service valves shall be 90% or greater, grease packed. Submerged service valves in potable water applications shall be 100% grease filled with FDA approved food grade grease. Documentation for the selected grease for submerged service valves shall accompany submittals. The Owner reserves the right to field verify grease levels. Non-complying gears shall be remedied by the factory, verified by the customer and signed off by both parties. No name or unbranded actuators will not be accepted.

M. Hardware: All fasteners and hardware shall be type 316 Stainless Steel.

N. Paint and coatings: The manufacturer is required to have and follow a system of valve preparation and coating which assures a quality holiday free application and which maximizes the available multi-decade protection the coating offers. Manufacturers that do not properly prepare or coat their valves properly will not be accepted.

The manufacturer must provide their written system of valve preparation and coating. This document shall include the methodologies used (quality compliance) as well as post application review (quality assurance). It will be based on a professional system of coating and grading such as NACE, SSPC, GSK, ISO or DIN and will include both text and color photo-documentation. The manufacturers coating system must be documented as well as implemented with a quality assurance

program to prevent unacceptable deviation. This coating system shall be submitted for approval. It shall be titled, signed and dated by the manufacturers Coating Department Head, its' Compliance Officer or an equal ranking staff.

1. Valves 48-inch and smaller: All external and internal surfaces except for the seating surface shall be 400-degree F plus, heat bonded fusion coated. Coating damaged in shipping or installation shall be noted and properly repaired to the satisfaction of the utility or its authorized agent.

O. Limit Switch. Where indicated on plans, valve shall be equipped with an on/off limit switch to communicate position to pump station PLC/RTU.

P. Manufacturers, No Equal (**Contractor shall confirm valve delivery date and ability to meet NSF Standard 61 requirements)

1. VAG Armaturen, EKN Double Offset
2. Av-Tek Inc., DEX Double Offset

It shall be Contractor's responsibility to confirm that valve supplier provides a guaranteed delivery date that meets the project schedule, and certifies that all materials meet NSF Standard 61 requirements for potable water service.

Failure to meet these requirements will be cause for rejection of valve supplier, and Contractor's substitution of an alternate supplier at no additional cost to the Owner. Contractor shall note that the naming of manufacturer's above does not guarantee that these specific requirements can be met by each of them.

PART 3 EXECUTION Not Used

3.1 INSTALLATION

A. Exposed butterfly valves shall be installed with a means of removing the complete valve assembly without dismantling the valve or operator. Installation shall be in accordance with Section 40 05 51 – Valves, General.

B. Contractor shall use the provided lifting lugs to move all project valve(s). The use of chains, lifting straps, rope or any type other strapping through the valve body is strictly prohibited. Correct lifting procedures shall be the Contractor's responsibility. As necessary, consultation with the valve manufacturer is recommended. The contractor shall be responsible for all damage and project delays resulting from improper lifting and moving procedures, these shall include but shall not be limited to: pulling the valve body out of round, gouges, scratches, displacing the gear box etc.

C. Butterfly valves 36-inch and larger must be inspected and certified by the manufacturer that the final installation meets all the manufacturers requirements, and that the actuator and disk have not changed positions from that as successfully tested at the factory.

D. Strict care shall be taken to assure valves are not installed under stress. In no instance shall adjacent mating flanges be forced into position. A progressive and proper star cross pattern shall be used to tighten valve flange mating bolts

END OF SECTION