

July 27, 2020

*Via email*

Marie E. Owens, P.E., Director  
Utah Department of Environmental Quality  
Division of Drinking Water  
195 North 1950 West  
Salt Lake City, UT 84114

Re: American Iron and Steel (AIS) Waiver

Dear Ms. Owens:

Introduction

This letter is to request a waiver to the American Iron and Steel (AIS) requirement under the Consolidated Appropriations Act of 2014. This request is for (1) 20-inch Double Eccentric Butterfly Valve being used in the 2200 West Waterline Replacement Project in West Valley, Utah project. Information presented in this document is a collaborative effort of the Granger-Hunter Improvement District, and the materials and equipment supplier as listed in a later section.

Type of Request

Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.

Description and Justification of Foreign and Domestic Construction Materials

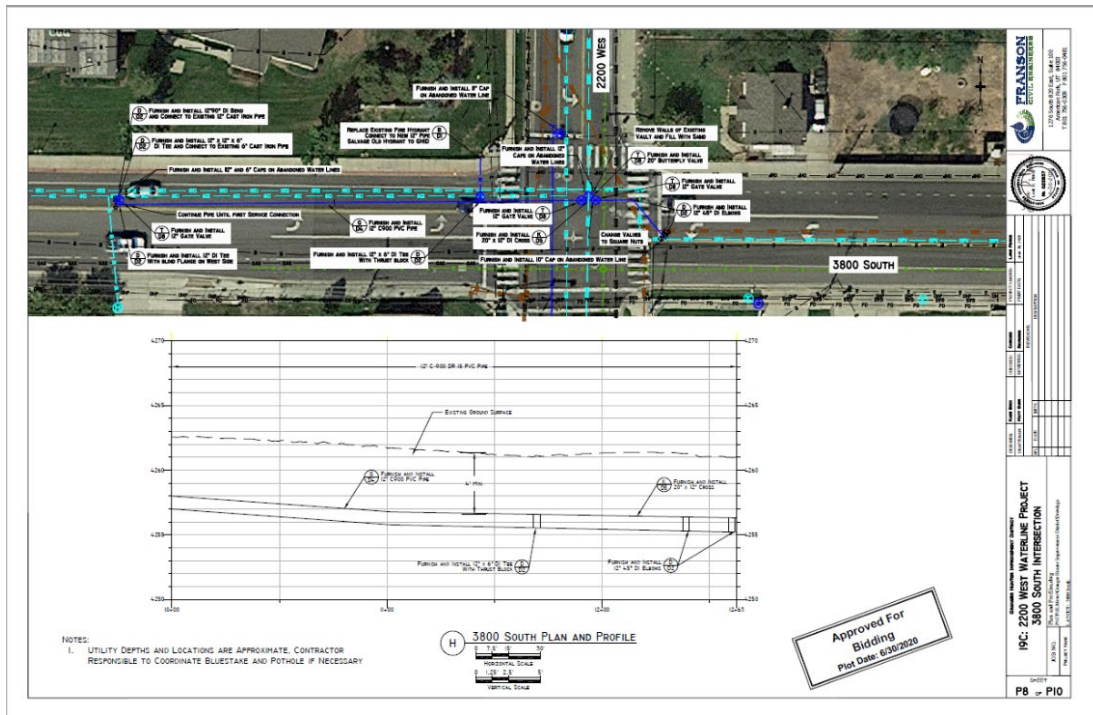
This project includes various types of materials and equipment important to the operations of a major water transmission project. There is a type of equipment specifically designed in this project that does not meet the AIS requirements and is not produced of sufficient quantity in the United States. This includes:

**1. Double Eccentric Butterfly Valves**

Double offset butterfly valves are being used where leak free isolation is critical for operation.

Justification for Use of Foreign Construction Materials

Purpose: Double offset butterfly valves are used in this project where leak free valves are critical to system performance. The double eccentric valve will not leak when future repairs are needed. The Av-Tek DEX double eccentric valve has been selected for this project. See drawing image below.



The following document is a brief overview of the critical design features of a double eccentric butterfly valve, expressly produced for the isolation of water, along with a few of its key attributes and characteristics.

### Rationale for Exemption

Double Offset Butterfly Design with NSF61 and NSF372 Required: **There are no U.S. manufacturers of this design.** Note NSF 61 and NSF372 (NSF = National Sanitary Foundation) are requirements demonstrating safe drinking water and no lead products. The double offset design assures a 100% leak free valve over many decades. A leak free design is needed to isolate both the upstream and downstream water sources to the flow and anti-cavitation control Plunger Valve which are located in below grade limited ingress and egress confined space vaults. The Plunger Valves have very long maintenance intervals, but maintenance or inspection would be expected over time. With disassembly of the isolated pressurized piping, the vaults must remain dry as they contain electrically and electronically charged devices. This is especially significant and applicable while agency personnel are present. The modern double eccentric design prevents the elastomeric seal from being compressed when the valve is in the open position. Current AWWA designs are single offset or zero offset whereby the disc compresses the elastomeric seal and are very highly prone over time to a compression set of the elastomeric seal. The compression set or permanent indentation(s) of the elastomeric seal become a leak path.

High Velocity Design: AWWA C504 Standards (AWWA= American Water Works Association) to which potable drinking water valves are designed to comply with, are designed to a maximum flow rate of 16 feet per second. The DEX Butterfly Valves are designed to line break conditions of over 50 feet per second. This means that should a water line break occur, the DEX is designed to handle the higher velocities associated with emergency condition isolation. No U.S. designed or manufactured valve meets these criteria.

High Velocity Elastomeric Seal: The Av-Tek Dex elastomeric seal is rated to over 300 feet per second. As previously noted , the high pipeline velocities that exist in emergency conditions produce very high localized velocities when the valve is being closed at shutdown. The DEX is designed to handle both pipeline high velocities as well as localized velocities. This attribute is not measured or required for U.S. AWWA valves.

Description of the foreign and domestic construction materials

Exhibit 1: Materials of Construction

P.NO	PART NAME	MATERIAL
1	Body	A536 Gr 65-45-12
1A	Body Seat	Type 316L Stainless Steel Overlay With Welding
2	Disc	A536 Gr 65-45-12
3	Disc Seat	EPDM
4	Retaining Ring	Type 304 Stainless Steel
5	Bolt	Type 304 Stainless Steel
6	Front - Back Bushing	Bronze C90800
7	O-ring	EPDM
8	O-ring	EPDM
9	Front Shaft	1,4462 Duplex Stainless Steel
10	Pin	1,4462 Duplex Stainless Steel
11	Back Shaft	1,4462 Duplex Stainless Steel
12	Front Adjustment Bushing	St 37 Carbon Steel
13	Front Cover	A536 Gr 65-45-12
14	Back Cover	A536 Gr 65-45-12
15	Bolt	Type 304 Stainless Steel
16	Setscrew	Type 304 Stainless Steel
17	Key	C 45 k Steel
18	O-ring	EPDM
19	Washer	Type 304 Stainless Steel
20	Bolt	Type 304 Stainless Steel
21	Bolt	Type 304 Stainless Steel
22	Washer	Type 304 Stainless Steel
23	Gearbox	-
24	Hand Wheel	Carbon Steel

**Overview and Data Support**

The Av-Tek DEX Butterfly is a specially engineered butterfly valve that corrects the flaws of the current typical single and zero offset AWWA commodity butterfly valve designed in the late 1950's and early 1960's.

The double eccentric butterfly is recommended as follows:

1. The Dex Butterfly valve has distinct engineered features that are not offered and/or readily available in current standard build AWWA C504 butterfly valves. Each valve is built to withstand higher pressure and velocity conditions than standard American butterfly valves.
2. The localized velocities across the resilient seat have reached over 300 fps without failure or issue.
3. Double Eccentric Butterfly Valve design: The DEX provides an additional offset over AWWA C504 standard butterfly valves. This additional offset prevents the valves elastomeric seal from being compressed in the open position and prevents the elastomeric

seal from taking a “compression set” which becomes a leak path when the valve is closed. This design greatly increases the longevity of zero leak sealing.

4. DEX butterfly valves are manufactured and received as a true zero leak bi-directional valve. Every valve is tested before it’s shipped to the customer.
5. DEX Butterfly Valves are designed for incidental surge or pressure spikes. They are able to handle 250 PSI Working Pressures as a standard, and if needed can be built to perform in 580 PSI pressure applications.
6. The DEX butterfly valves exceed AWWA maximum 16 feet per second (fps) design. It is rated to over 50 fps for most all emergency line break isolation needs.
7. All sizes have field replaceable seals (if ever needed) that are quick to install. Seal replacement can typically be performed in 1–3 hours on very large valves (not days). The installation is very simple and factory skill and labor are not needed.
8. Valves have a high performance fusion bonded epoxy coating system which provides long term interior and exterior corrosion protection.
9. Valves have a corrosion free dry shaft and disc hub rather than a wetted valve shaft. This allows the actuator to be removed without needing to dewater the pipeline and provides corrosion protection of both the shaft and hub areas preventing premature failure.
10. Valve Shafts are of a high strength 2205 Duplex stainless steel that is not offered/or not readily available in current AWWA butterfly valves. 2205 Duplex Stainless Steel is a superb material for long term strength and corrosion resistance.

### **Support Data**

1. Av-Tek Inc is a locally based Utah company that works with its European manufacturing facility to produce highly efficient butterfly valves with a modern design.
2. The DEX Butterfly Valve has been tested to 300 fps localized velocity without damage to the elastomeric seat. High velocities can occur during primary filling of the pipeline, closing a valve under high flows and when positioning a valve. Knowing the valve is not expected to have any issues with cold flow, scalloping, tearing or dislodgement of the seat has tremendous value, especially for buried service valves.



Seal Failure: Domestic valve dislodgement of its vulcanized seal.

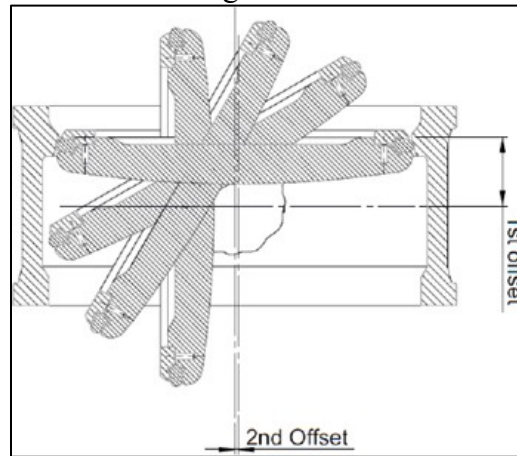


Seal Failure: Competitor valve with cold flow and scalloping of the elastomeric seal.

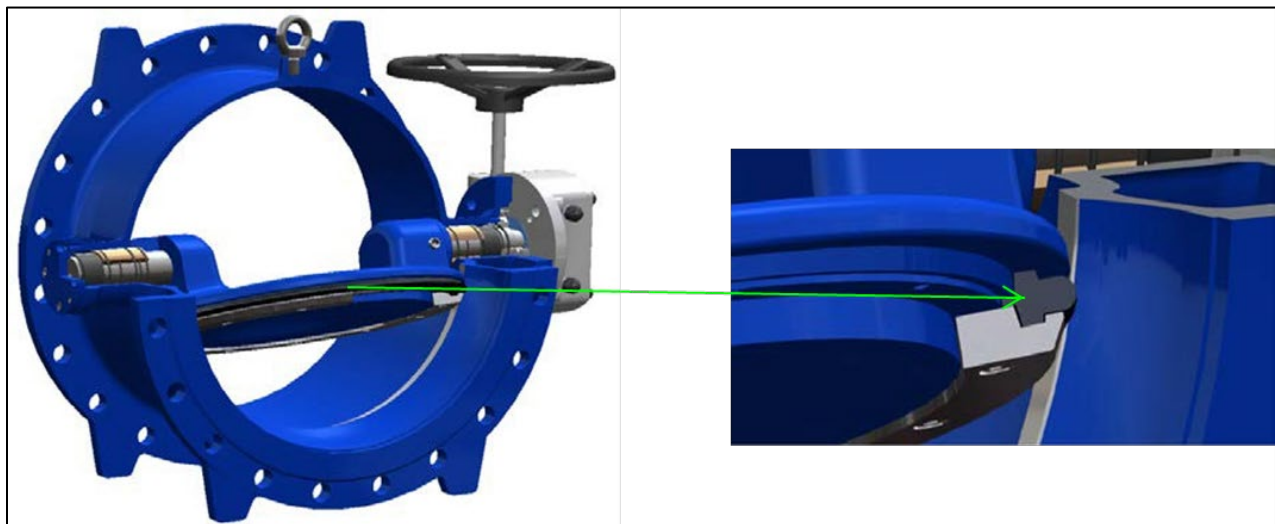


3. The Av-Tek Double Eccentric Butterfly Valve consists of two primary offsets. The first offset the shaft is located on the backside of the disc and the second offset the valve shaft is offset from the centerline of the valve body. These offsets allow for a camming effect, whereby the elastomeric seal is not compressed/deformed until the disc is fully rotated into the body. This reduces wear of the valve seal and eliminates the risk of a "compression set" of the elastomeric seal and consequently the seal will not leak if the valve is held in the open position for extended periods of time.

Making Double Offset Butterfly Valves requires tighter machining tolerances and better casting than commodity zero offset or single offset waterworks butterfly valves.



4. Each DEX Butterfly Valve undergoes a full hydrostatic test functionality to confirm performance. The successful testing parameters exceed those set forth in the regular AWWA standard.
5. Av-Tek offers multiple pressure classes for their waterworks valve, 362 psi and well as 580 psi pressure class.
6. Av-Tek DEX butterfly valves can be used to over 50 feet per second line velocities; no other domestic butterfly valve publishes this capability.
7. The elastomeric seal located on the valve disc is easily replaceable in the rare case it becomes damaged. Special tools or a factory technician are not required to make a repair or replacement of the seal.



8. Av-Tek Valves come standard with an industry leading Fusion Bonded Epoxy interior lining and exterior coating. Av-Tek is ISO 9001 certified and complies with a strict GSK coating system – Heavy Corrosion Protection of Valves by Epoxy Coating. This system tests for 1. Thickness 2. Coating Adhesion (pull test), 3. Cathodic Disbonding, 4. Holiday Free and 5. Impact Resistance Testing.

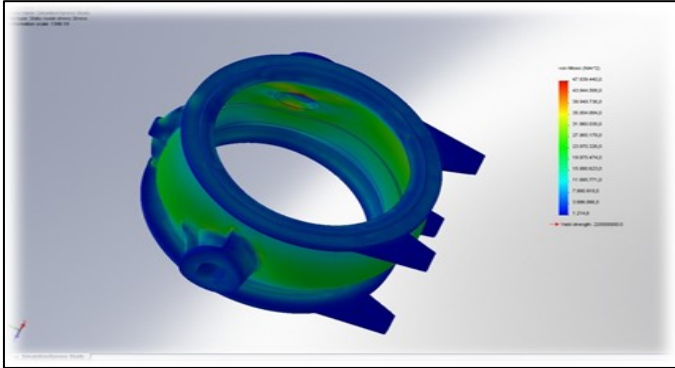


Other Coating systems after just a few years of service.



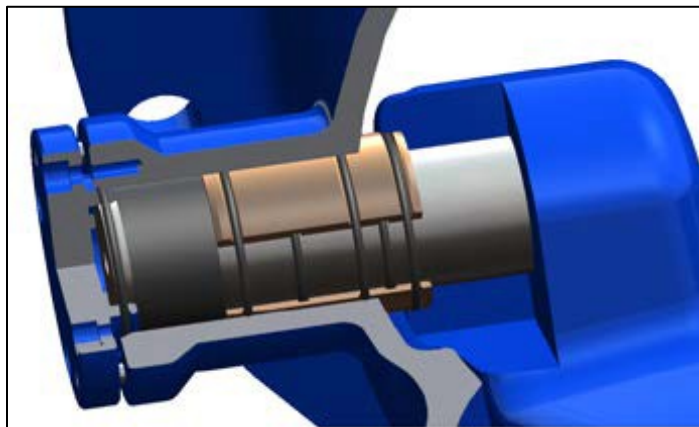
9. Each valve utilizes a high-quality casting from European origin which undergoes precision machining to produce tight tolerances between disc and valve body. Butterfly valves castings undergo a Finite Element Analysis to ensure longevity and strength.

## Finite Element Analysis



10. Av-Tek DEX utilizes 6 O-rings to maintain a dry shaft and seal.

Keeping the shaft and disc hub areas dry prevents corrosion in the shaft bore and components. This also allows for the gearbox actuator to be removed from service without having to de-water the entire pipeline.





Corrosion of the shaft bearings and in the hub areas increase operating torques and can cause the stem to bind and cease rendering the valve inoperable.



11. DEX butterfly valve seats are welded to the ductile iron body via 316L Stainless Steel high robotic weld method. Leaving zero chance for water ingress beneath the seat.

Robotic welded 316L stainless steel body seat with micro finish



Failed sealing system of a domestic Butterfly Valve.



**Other waiver requests accepted by State for same item**

Project Waiver of AIS Requirements for Double Offset Butterfly Valves for Central Utah Water Conservancy District, Utah (DWSRF)

- <https://www.epa.gov/cwsrf/project-waiver-ais-requirements-double-offset-butterfly-valves-central-utah-water-conservancy>

In conclusion, the Av-Tek Dex Double Eccentric is critical to the long-term leak free isolation needs of this project. The robust double eccentric design of the Dex Butterfly is ideally suited to accomplish these goals and has been deemed necessary by third party project engineering consultants and project engineers of Granger-Hunter Improvement District. The unique high-performance design and the shaft materials of the DEX butterfly valve are not currently available and/or offered in sufficient and reasonably available quantities and of a satisfactory quality from domestic sources.

Please feel free to call if you have any questions.

Sincerely,

Lane Peirce, P.E.

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](mailto:DWSRFWaiver@epa.gov).