MEPNN Supplier Scouting Opportunity Synopsis

Item Information

Scouting Number	2023-077
Item to be Scouted	Plunger Valve
Days to be scouted	15
Description	Plunger valve with diameters ranging from 4" diameter up to 42" diameter plunger valve for water flow control.
State item to be used in	New Mexico

Contact Information

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Department / Company / MEP Center	Jacobs Engineering
Bureau / Division / MEP Center Regional Office	New Mexico

Supplier Information

Type of supplier being sought	Manufacturer
Reason	BABA

Summary of technical specifications and performance requirements

Describe the manufacturing processes (elaborate to provide as much detail as possible)	Metal Casting and Assembly. See attached spec sheet for additional information.
Provide dimensions / size / tolerances / performance specifications for the item	See attached PDF specifications.
List required materials needed to make the product, including materials of product components	See attached spec sheet.
Are there applicable certification requirements?	No
Are there applicable regulations?	Yes
Details	NSF/ANSI 61 A weighted average lead content of 0.25 percent as determined by NSF/ANSI 372.
Additional Technical Comments	

Volume and Pricing

Estimated potential business volume	5 units
Estimated target price / unit cost information (if unavailable explain)	$170,000 per unit

Delivery Requirements

When is it needed by?	Project dependent over next 8 years
Describe packaging requirements	Palletized products
Where will this item be shipped?	Clovis, NM

Additional Comments

Is there other information you would like to include?	

List required materials needed to make the product, including materials of product components:

2 PART 2 PRODUCTS

2.01 GENERAL

A. Components and Materials in Contact with Water for Human Consumption:

1. Comply with the requirements of the Safe Drinking Water Act and other

applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with:

a. NSF/ANSI 61.

b. A weighted average lead content of 0.25 percent as determined by NSF/ANSI

372.

2. Use or reuse of components and materials without a traceable certification

is prohibited.

3. Acceptable Product Marking: NSF 61 and NSF 372 (or NSF 61 G) or other

accepted certifier marks demonstrating third party certification with these requirements.

4. Product shall be certified compliant with these requirements by an ANSI

accredited certification organization.

2.02 PLUNGER VALVE PERFORMANCE REQUIREMENTS

A. Performance: Each valve shall be designed to operate smoothly throughout

the specified flow range without cavitation, excessive noise, or vibration for the conditions stated below.

1. Valve design shall include a perforated cylinder insert to prevent

cavitation and any special other features as required by the manufacturer for cavitation control to reduce pressure and provide flows specified below.

Perforated cylinder inserts shall (both at high pressure differential and at low pressure differential operating conditions) not cause blockage in valves requiring maintenance other than simply opening or closing valve to dislodge and flush water out of valve. These criteria do not apply to those types of items (i.e., woody, fibrous, or hard particles) which would plug the valve openings anyway.

2. Valve manufacturer shall notify Engineer in writing of any risk of

cavitation damage to the piping downstream of the plunger valves due to the operating conditions indicated on Drawings and Specifications and suggest elongating straight piping downstream of the

valve if such modifications are deemed needed to protect the downstream piping (including valves) from cavitation damage.

B. Noise: Operating noise levels shall not exceed 95 decibels (dBA) at a

distance of 3 feet from the valve at the normal flow point. Material stresses shall not exceed 1/5 of the ultimate or 1/3 of the yield strength of the material. Flow rate as a function of pressure drop across the valve shall be linear to within 3 percent.

g. Operating Function: Modulating/throttling flow control valve, may operate

up to 365 days per year. Valve shall function as modulating flow control valve with flow setting and flow "dead band" width (flow variation from setting where valve will not move) setting selected by operator. Flows will be read at a meter upstream of valve and transmitted to control room at upstream water treatment plant. Actuator shall be equipped with a continuous position transmitter providing 4 mA to 20 mA signal output for feedback to control room and to allow for position/flow control.

2.03 PLUNGER VALVE OPERATING REQUIREMENTS

A. Valve Assembly Components: Each plunger valve assembly shall consist of a

flanged short conical inlet section having an internal cone to divert the water flow into the annular chamber of the body section.

B. An oval body section with an inner annular chamber shall be formed by the

body shell. The plunger with custom designed cylinder control trim is part of internal slider-crank mechanism and is driven by an outside 90 degree AWWA worm gear. The control trim cylinder shall be field removable and replaceable with alternate control trim when hydraulic conditions change or new operating parameters are required.

C. The plunger shall move in an axial flow direction to reduce or enlarge the

annular flow cross-section through slots in a degressive manner, and the medium will flow through the customized regulating cylinder from the outer annular chamber to the inner chamber of the plunger for flow control.

D. The seals of the plunger valve shall allow the valve to be drip and bubble

tight in both flow directions for the long term and without the need for premature seal replacement. The outside of the plunger shall seat against a quad-O ring sealing ring. The quad-O ring shall deflect and seal in both axial directions. The quad O-ring will provide the best available design for both modulating and for open close service in the prevention of twist, roll and point loading of the plunger seal. The seal shall be insensitive to debris. The elastomeric profile sealing ring shall seat leak tight at the downstream end of the plunger. The elastomeric profile sealing ring shall be mechanically retained in the downstream flange of the valve body by a stainless steel seat ring. It shall be recessed from the high velocity flow through the complete stroke of the valve. Valve shaft seals shall prevent the long term potential of water entering into the gear case. The valve operating shaft shall have five O-ring seals; two on the shaft at the crank mechanism and three on the shaft at the gear box. The O-ring seals shall

maintain a drip tight seal regardless of modulation cycles or inactivity. The O ring seals will prevent corrosion of the shaft body bore.

E. Valves shall be provided with 4 integral support feet per each 180 degree

circumference. There shall be four total lifting lugs, one per each foot. The four lifting lugs shall be factory drilled and taped. They shall be sufficiently broad in placement to assist with rigging of an unbalanced load.

F. The valve shall function properly and without issue within any 180 degree

flange rotation.

2.04 PLUNGER VALVE DESIGN FEATURES

A. Plunger valve shall be a short body one-part-body design with interior

geometry that provides water flow that is guided around a streamlined internal body. The design shall feature a geometrically optimized design, a continuous annular cross-sectional reduction from inlet to throttle cross-section, and continuous rise of flow velocity to the exit without producing cavitation.

B. Plunger valve design shall feature a customized designed plunger with

tailored anti-cavitation trim with slots or orifice holes to minimize cavitation. Slots or orifice shall be fully closed when the valve is placed in the closed position. The plunger shall be seated against the upstream quad O-ring and an elastomeric seat located in body downstream flange with the valve in the closed position. The elastomeric seat shall be properly kept in position in a groove in the body and the downstream stainless steel seat ring shall secure the elastomeric profile sealing ring from displacement. The profile seat ring shall not be penetrated by fasteners, exposed to the flow stream in the open position and shall not be subject to cold flow of the elastomer.

C. Plunger valve design, when open during operation, shall feature plunger

assembly movement in the upstream side direction to release water through the slots or orifice holes.

D. Plunger valve design shall feature advance and retract axial strokes of

the plunger, guided in the internal body by an internal slider-crank mechanism of stainless steel. The crank and push rod mechanism shall have an industry standard 90 degree angle of rotation stroke from open to close matching the travel for AWWA waterworks quarter turn valves. The provided actuator shall include a mechanical stop in the open and closed positions which will prevent attempts of actuator to hyper extend the plunger or place undesired stresses on the internal linkage system. The plunger shall slide and be contained in the axial position by guide rails. To prevent possible corrosion between the guide rails and the valve body, the guide rails shall be completely fused to the valve body in an overlay weld process to prevent any gaps or corrosion pathways. Guide rails which are riveted or bolted to the valve body are not acceptable for long-term operability and corrosion protection. The guide rails shall be bronze and shall be positioned around the plunger in an uneven quantity to reduce the potential for damaging harmonic vibration, clogging or excessive wear. The guide rails shall be low to no lead and very low zinc content to prevent dezincification.

E. Motion shall be controlled by means of electric actuator attached to the

body section, equipped with a handwheel that can also be used to operate the valve manually or in the event of power failure to the actuator. Actuate plunger valve as specified and described in Section 40 27 02.03, Electric

Motor Actuators. Valve supplier shall size the actuator and coordinate with

the actuator manufacturer for proper fit.

F. The design of the annular throat cross-section in any position of the

plunger shall ensure linear regulation of flow.

G. Flanged connections shall mate with adjacent Class 125 ductile iron

flanges.

H. The movement of the plunger shall be controlled by means of maintenance

free irreversible, self-locking, quarter turn, 90 degree AWWA worm gear unit with externally adjustable mechanical stops to limit valve travel in both the open and closed positions. The valve stroke shall equal 90 degrees plus or minus 2 degrees, whereby the mechanical stops of the worm gear shall be engaged before the full extension or retraction of the plunger. In no instance shall the full output torque of actuator be allowed to be transmitted to the valve at its end of travel, either open or closed, without engaging the travel stops of the worm gear first. The AWWA worm gear unit shall be operated by a hand wheel or electric actuator.

I. Plunger Valve Base Plates. Submit and obtain approval for, and provide,

base plates for plunger valve. Base plates must be able to be unbolted to remove the valve from the adjacent process piping by sliding the valve up to

3 inches horizontally away from the upstream flange before it is lifted vertically. Base plates shall secure valve to a reinforced concrete base (by installation contractor) so that the plunger valve does not vibrate.

2.05 MATERIAL REQUIREMENTS

A. Principal Component Parts Materials of Valve Construction:

Item	Size	Material	Specification
Valve Body	All	Ductile Iron	ASTM A536, GR. 60,40,18
Plunger	All	Stainless Steel	AISI 304
Regulating Cylinder	All	Stainless Steel	AISI 304
Shaft Bushing		Bronze	ASTM C90800/CuSn12
Crank Shaft	All	Stainless Steel	AISI 420
Crank Mechanism (sizes 6" – 78")		All	Stainless Steel AISI 304
Seat/Retaining Ring	All	Stainless Steel	AISI 304

Plunger Guide Rails All Bronze welded overlay CuAl8 (lead <0.0020%

Zinc <0.008%

Quad-Sealing-Ring All EPDM Hardness A:80, (=/- 5). Elongation >200%, Tensile

>12 N/mm, Elasticity >25%

Profile Sealing Ring All EPDM Hardness A:80, (=/- 5). Elongation >200%,

Tensile >12 N/mm, Elasticity >25%

O-Rings, Actuator Shaft All EPDM Hardness A:80, (=/- 5). Elongation >200%,

Tensile >12 N/mm, Elasticity >25%

Worm Gearbox Housing: Ductile Iron GGG 40

Worm Wheel: GGG 60 or bronze

Coupling: Quenched and tempered steel acc. to 10083 2 Input Drive Shaft (Secondary Gear): Stainless steel 10088 3

B. Fasteners: All studs, bolts, washers, and nuts in contact with water shall

be Type 304 or Type 316 stainless steel.

C. All materials of moving components in contact with each other shall be of

dissimilar hardness to prevent galling. The valve shall be moved through an open-close-open cycle three times after final assembly and prior to shipment to ensure this requirement.

D. Coating shall be in accordance with Section 09 90 04, Painting, System No.

4. Valve shall be lined with manufacturer's standard fusion bonded epoxy for potable water service, NSF 61 compliant, 12 mils minimum dry film thickness. Stainless steel parts, or parts requiring no lining for clearances, do not require a lining.