

CITY OF PHILADELPHIA
WATER DEPARTMENT
PURCHASE SPECIFICATIONS
FOR
STANDARD PRESSURE BUTTERFLY VALVES

<u>Subject</u>	<u>Section</u>
Manufacturers' Qualifications	1
Quality Control Measures	2
Bidder Instructions	3
AWWA Standard	4
Operating Conditions	5
Direction of Closing	6
Valve Body	7
Casting Markings	8
MJ Ends	9
Valve Seats	10
Valve Disc	11
Valve Shaft	12
Stuffing Box	13
Valve Operators	14
Worm Gear Operators	14 A
Traveling Nut Operators	14 B
Street Level Over Torque Protector	15
Coatings General	16
Valve Coatings	17
Operator Coatings	18
Exterior Fasteners	19
Testing	20
Shipping	21
Shop Drawing Review	22
Revisions	
Over Torque Protector Detail	

1. Manufacturers' Qualifications: The butterfly valves shall be produced by manufacturers of established reputation and experience who shall certify that they have been producing valves of a similar or identical design and size in compliance with similar or identical specifications for a minimum of five years (before bid date) and that their product has proven satisfactory in both performance and service under actual operating conditions.

The bidder to whom this purchase contract is awarded, will be required to machine, assemble, and test the valves with his own production force. He shall also be required to establish that he currently has within his own organization, an adequate and experienced engineering staff qualified to analyze and resolve problems which may arise relating to the manufacture, assembly and testing of the valves. Subcontracting or subletting any of the aforementioned portions of the work will not be permitted.

2. Quality Control Measures: In an effort to ensure that the manufacturers' valve designs are in accordance with PWD's specific requirements, that the manufacturing processes are capable of producing a quality product, and that adequate quality control and testing procedures are carried out, the bidder to whom this purchase contract is awarded will be required to adhere to the provisions contained in PWD's Quality Certification Standard QC-11 for Standard Pressure Butterfly Valves (3" to 20") & (24" & Larger). The bidder shall also be required to establish that he currently has within his own organization, a competent and adequately staffed operating quality control program responsible for maintaining high standards regarding materials, manufacturing, and testing of work done in his plant.

3. Bidder Instructions: Furnish properly Q.C. certified valves from a current PWD approved source. The testing required for valves 24 in. & larger must be witnessed by a Quality Certification Inspector at the manufacturing plant. In order to prepare the necessary travel arrangements, the manufacturer shall notify the Quality Certification Staff at least 4 weeks prior to final assembly and furnish the expected shop testing date. The Water Department will bear all expenses incurred by the Q.C. inspector. Contact:

William Roscioli, Manager
Quality Certification Staff
Philadelphia Water Department
Materials Engineering Laboratory
1500 E. Hunting Park Ave.
Philadelphia, PA 19124
215-685-1447

4. AWWA Standard: Butterfly Valves (including operator) shall be in accordance with AWWA C-504, and as modified herein.

5. Operating Conditions: Butterfly valves shall be class 150B and shall be suitable for buried service and designed for the following operating conditions with flow in both directions:

Maximum shut off pressure 150 psi
Maximum velocity for 16" 15 fps
Maximum velocity for 20" 15 fps
Maximum velocity for 24" 15 fps
Maximum velocity for 30" 15 fps
Maximum velocity for 36" 15 fps
Maximum velocity for 48" 13 fps

6. Direction of Closing: Furnish valves which close when operating nut is turned in a counter-clockwise direction (viewed from above).

7. Valve Body: Furnish valves with cast iron valve bodies in accordance with ASTM A-126, Class B.

8. Casting Markings: Furnish valves with the following information cast into or welded on the valve body's circumference: manufacturer's name/initials; year of manufacture; size; rated working pressure; and "PWD". The size of the letters for the year for "PWD" and the year of manufacture shall be two (2) inches in height and be raised one eighth (1/8) inch. All other information shall be one (1) inch in height and be raised eighth (1/8) inch. The manufacturer's name and year of manufacture shall be located at the top of the valve to facilitate retrieval of this information after the valve has been installed.

9. MJ Ends: Furnish MJ valves with integrally cast mechanical joint ends conforming to AWWA C-110 and ANSI A-21.11. Furnish approved retainer glands for all mechanical joints. Retainer glands for valves up to 16" shall have a 350 psi rating. Retainer glands for valves 20" and larger shall have a rating of 250 psi.

10. Valve Seats: Furnish valves with the rubber seats in the body or on the disc. For valves 30" and larger, seats shall be field adjustable and replaceable in accordance with AWWA C-504.

11. Valve Disc: Furnish valves with discs made of either cast iron conforming to ASTM A48-Class 40, ductile iron conforming to ASTM A536- grade 65-45-12 or of stainless steel type 316 and which are offset to provide an uninterrupted 360 degree seating edge. Furnish on the circumference of the disc a seating edge of a sturdy design which has proven to be resistant to both wear and corrosion. The seating edge material shall either be stainless steel, type 316 or a material of equal quality. Furnish only stainless steel fasteners to attach the shaft and disc together.

12. Valve Shaft: Furnish valves with turned, ground, and polished stainless steel shafts of diameters in accordance with Table 3 of AWWA C-504, Class 150B. Use stainless steel in accordance with ASTM A-276, Type 304. Furnish only stainless steel fasteners to attach the shaft and disc together.

13. Stuffing Box: This requirement has been deleted.

14. Valve Operators: . Furnish horizontal shaft valves with manual operators, nut operated, for buried service, to close in the direction specified in Paragraph 6. Operators shall conform to the applicable requirements of AWWA C-504 and to the specific requirements stated herein. Operating nut shall be standard AWWA 2 inch square. Furnish operators in a housing which is 90% packed with grease and watertight under pressure to at least 10 psi. The blend of grease shall be tested and appropriate for storage in outdoor temperatures.

Furnish operators with the rated torque capability to seat, unseat, and hold in any intermediate position, without creeping or fluttering, the valve disc it controls under the operating conditions specified. Furnish operators designed for a differential shut-off pressure of 150 psi. All components of the operators must withstand, without damage, an input torque of 300 ft.-lbs. at the operating nut when either in the fully open or closed position.

All fasteners used to secure the operators appurtenances, including spur gears, AWWA stops, and housing covers, and to attach the operator to the valve body shall be type 304 stainless steel. The manufacturer shall indicate a method of assuring the fasteners will not loosen during the shipping process. This method may be through the use of a thread locker or lock washer.

The setting and adjustment of the operator's position limit stops shall be performed by the valve manufacturer.

The operators shall be the traveling nut design or the worm gear design which meets the following applicable specifications. At the time of purchase the Water Department will indicate which arrangement the manufacturer shall furnish.

A. Worm Gear Operators: Worm gear operators shall conform to the applicable requirements of AWWA C-504. Furnish operators with a spur gear attachment and AWWA input shaft stops. An adapter plate suitable for buried service shall be furnished, when required, to allow the worm gear operator to be mounted on the manufacturer's valve. This adapter, when required, is considered an important component of the valve assembly and therefore will be subjected to the same review and approval as the other parts of the valves. Attention is directed to Section 22. Shop Drawing Review concerning this matter.

B. Traveling Nut Operators: Traveling nut operators shall conform to the applicable requirements of AWWA C-504. Furnish operators of the traveling nut type which are self locking and that have adjustable mechanical stops at both the open and closed position.

15. Street Level Over Torque Protector: Furnish valves equipped with an Aunspach valve over torque protector. The Aunspach over torque protector (Model D-86-250) shall disengage automatically if torque in excess of 220 foot-pounds is applied when either opening or closing the valve. It should automatically reset when torque is reduced to pre-set level. The over torque protector shall be configured with a 2 inch AWWA nut at the top for valve key operation, and socket at the bottom to fit over top a 2 inch square AWWA nut. The over torque protector shall have a shaft extension which is configured as shown on the attached drawing. Vendor's design shall be submitted for approval.

The shaft extension shall be type 304 stainless steel with a 2 inch square AWWA operating nut and socket bottom. The shaft's operating nut shall be held in place by a shear pin. The solid stainless steel shear pin shall be 3/16 of an inch in diameter, annealed and cold worked so as to shear at a 250 foot-pounds torque. The shaft's bottom socket shall be field adjustable to allow for field cutting of the shaft length. Furnish shafts in 5 ft. lengths unless otherwise specified.

Furnish a standard PWD 7 inch cast iron valve box to house the over torque protector within the roadway. The valve box shall also extend down around the shaft and set on the valve operator in such a manner so that no foreign matter can collect between the pipe and the shaft.

Over torque protector manufactured by:

Aunspach Controls Company
1897 McKelvey Hill Drive, Suite 301
St. Louis, Missouri 63043
Phone: (314) 576-7587

16. Coatings General: The surfaces of iron and carbon steel shall be coated as herein specified or as approved. The surfaces to be coated shall be sand blasted in accordance with the requirements of the Steel Structures Painting Council Surface Preparation Specification No. 10- Near White Blast Cleaning, SSPC-SP10.

There shall be strict adherence to the manufacturer's directions for surface preparation and application of coatings. All coatings must be shop applied at ambient temperature 60 degrees Fahrenheit and above. Coatings shall not be baked but shall be allowed to dry or cure in a controlled environment at temperatures between 60 and 120 degrees Fahrenheit.

The coating film shall not contain any bare spots, blisters, or cracks, and shall be uniformly deposited without runs or sags. The coating shall be worked into angles and crevices formed by joining members.

All coating materials shall be delivered to the manufacturers' shop in original, unbroken and unopened containers plainly marked with name, brand and analysis of the product, and the name of the manufacturer. Maximum storage time of the coating material shall be one year but in no case shall old or outdated material be used on the work. Should any coating be damaged or found unsatisfactory, such coating shall be removed to the extent directed and the affected surface again be prepared, recoated and retested.

17. Valve Coatings:

17.1 Exterior Surfaces: Coat exterior surfaces with an approved asphalt varnish conforming to Federal Spec. TT-V-15C and in accordance with AWWA C-504. Non-machined surfaces shall be coated to a thickness of 16 mils. Apply as many coats of the manufacturers' suggested coating thickness to achieve the specified thickness.

17.2 Interior Surfaces: Coat all interior surfaces of the valves except for stainless steel surfaces, with epoxy that resists corrosion, bacterial attack, and blistering. Use an approved epoxy coating which meets NSF Standard 61 and which is in accordance with AWWA D102. Apply one smooth coat to machined surfaces, spot faces, and bolt holes. Non-machined surfaces shall be coated to a dry film thickness of 16 mils. Apply as many coats of the manufacturers' suggested coating thickness to achieve this specified thickness.

After curing, the interior coating shall not be easily chipped or peeled by penetration with a knife point and the supplier shall touch up all spots damaged by such knife point tests.

The completed interior coating shall be given an electrical flaw detection test in accordance with the recommendations of the manufacturer of the coatings as approved by and under the direction of the Engineer. All damaged or unsatisfactory areas shall be repaired and retested until they are approved.

18. Operator Coatings:

18.1 General: Coating of assembled valve operators will not be permitted. The supplier shall furnish a coating procedure for each component. The intent of this coating procedure is to provide for disassembly of the equipment without the cracking and breaking away of paint that has bridged and sealed the mating parts.

The following applicable individual components of each operator shall be coated and cured prior to assembly:

- 1-Housings
- 2-Housing Covers
- 3-Housings for AWWA Stops
- 4-Housing Covers for AWWA Stops
- 5-Housing for Spur Gear Attachment
- 6-Any other external mating parts

18.2 Exterior Surfaces: The operator's exterior shall be coated with an approved asphalt varnish conforming to Federal Spec. TT-V-15C and in accordance with AWWA C-504. Non-machined exterior surfaces shall be coated to a thickness of 16 mils. Apply as many coats of the manufacturers' suggested coating thickness to achieve the specified thickness.

18.3 Interior Surfaces: The interior surfaces of the housings for all components of the operator shall be coated with one of the following processes.

1. Glyptal Series 1201 Red Enamel with a dry film thickness of 3 mils.
2. An epoxy coating which meets NSF Standard 61 and which is in accordance with AWWA D102. Apply one smooth coat to machined surfaces, spot faces, and bolt holes. Non-machined surfaces shall be coated to a dry film thickness of 16 mils. The epoxy coating shall be given an electric flaw detection test in accordance with the coating manufacturers recommendation as approved by the Engineer.

For either process, apply as many coats of the manufacturers' suggested coating thickness to achieve the specified thickness.

A. Worm Gear Operators: Furnish worm gear operators with Glyptal Series 1201 Red Enamel interior coating or equal.

B. Traveling Nut Operators: Furnish traveling nut operators with epoxy interior coating.

19. Exterior Fasteners: Furnish valves with stainless steel, type 304, exterior fasteners on the valve body and the operator.

20. Testing: Furnish valves tested in accordance with Sections 5.2, of the Rubber-Seated Butterfly Valves, ANSI/ AWWA Standard C504 (most recent revision), Section 2.4 of PWD's Quality Certification Standard QC-11 for Standard Pressure Butterfly Valves (3" to 20") & (24" & Larger) and the requirements of the following paragraphs. Certified copies of proof of design tests performed on prototype valves of the type specified, as described in AWWA C504 Section 5.2.4, shall be furnished to the Engineer.

After assembly, the valves shall be tested with air pressure for bubble tightness at 150 psi differential across a closed disc. Two such tests shall be made for each valve, one with the air pressure on the upstream side of the disc and the second with the air pressure on the downstream side of the disc. Bubble tightness is required in both directions. Duration of all tests shall be not less than ten minutes.

As an alternative to the air pressure test, the valve may be given a 150 psi hydrostatic leakage test. Two such tests shall also be made, one with hydrostatic pressure on the upstream side of the disc and the second with the hydrostatic pressure on the downstream side of the disc. During this test, the valve shall be droptight. Duration of each test shall not be less than ten minutes.

With the disc in the open position, the valve body shall be subjected to a 300 psi hydrostatic test for a duration of fifteen minutes. During this test, there shall be no leakage through the metal, the end joints, or the shaft seal, nor shall any part be permanently deformed.

The valves shall be shop adjusted to insure proper operation. The operator shall be installed on the valve prior to the shop adjustment.

21. Shipping: The valves shall be complete in all respects when shipped. The manufacturer shall use care in preparing them for shipment so that no damage, due to the manufacturer's negligence, will occur in handling or transit. All parts shall be drained of water. The disc shall be placed just off a closed position.

The valves shall be banded to skids in such a manner as to prevent damage in subsequent handling.

All unpainted steel and iron machined surfaces shall be coated with a protective slushing compound.
Fullface flange protectors of waterproof plywood or weather resistant pressboard, of at least the diameter of the flange OD, shall be fastened to each flange to protect both it and the valve interior.

22. Shop Drawing Review: If the manufacturer has not previously furnished the specified valves he shall submit Shop Drawings to the Water Department for approval prior to the start of assembly. Shop Drawings shall show all dimensions, all types of material used, and shall identify each part of the complete valve assembly. Submit Shop Drawings to:

Michael Lavery,
Manager, Design Branch
Philadelphia Water Department
ARAMARK Tower, 2nd Floor
1101 Market Street
Philadelphia, PA 19107-2994

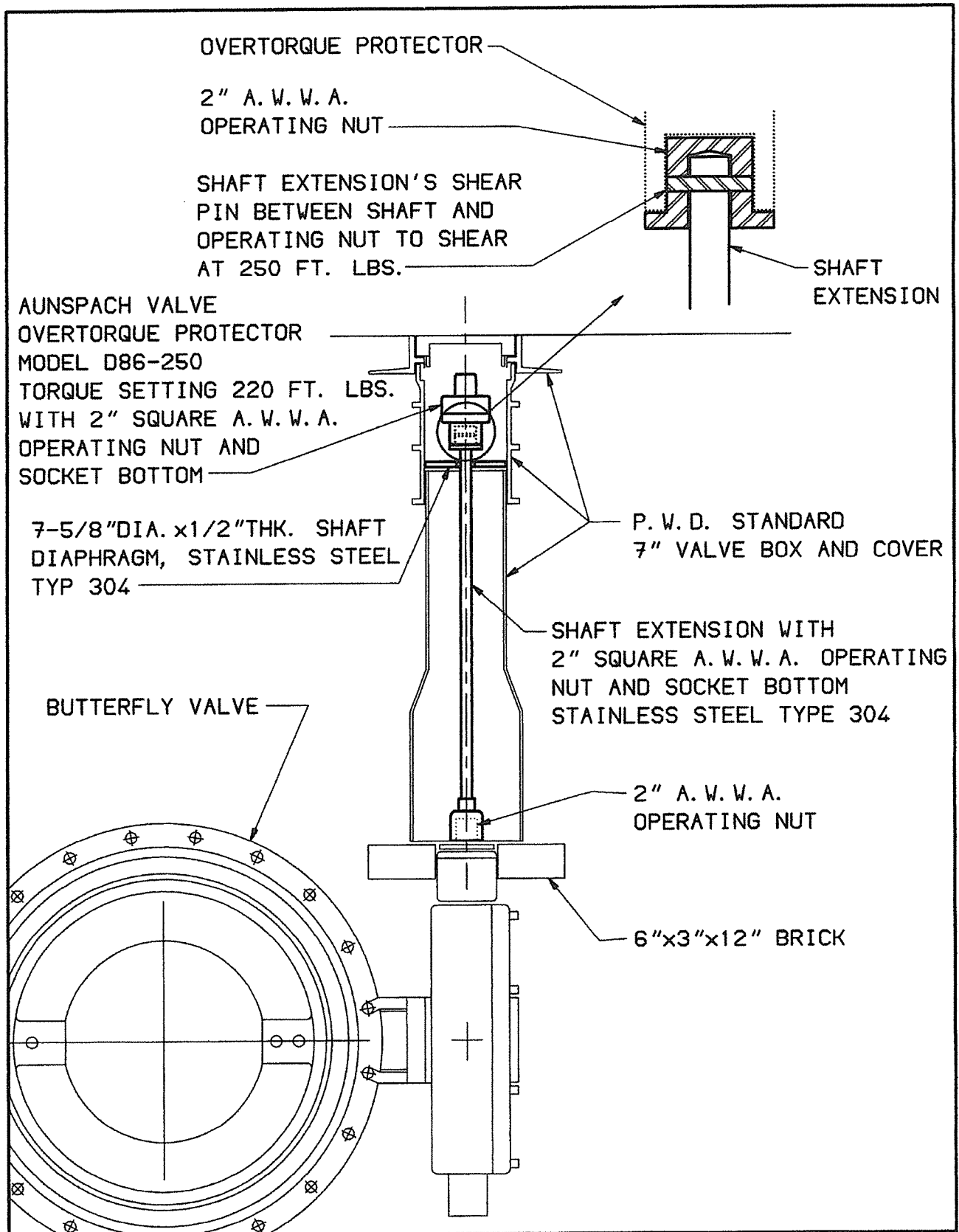
After the Shop Drawings have been approved the manufacturer shall furnish three sets of O & M manuals containing the instructions for the operation and maintenance of the valves. The manuals shall clearly indicate the valves to which it applies, including manufacturer, model number, size, serial number, and year of manufacture. Once Shop Drawings have been approved by the Water Department it will not be necessary for the manufacturer to submit drawings on future orders for valves to be used in the City of Philadelphia as long as the valves to be supplied conform to the previously approved Shop Drawings. However, if the manufacturer has modified the design of any portion of the valve assembly he must submit new Shop Drawings which reflect that change.

With the incorporation of worm gear operators into this specification, manufacturers who have approved shop drawings for valves supplied to the City in the past will be required to submit only those drawings which detail the operator assembly and the adapter when such an arrangement is specified.

REVISIONS:

REV. #	REV. DATE	APP. BY	REVISION DESCRIPTION
1	3/12/93	M. Lavery	Initial issue date..
2	4/12/93	M. Lavery	Section 16 and 18: Added more details on coating requirements.
3	8/30/93	M. Lavery	Section 5: Decreased maximum velocity for 48" from 15 fps to 13 fps Section 14: Added requirements for standardized valve operation. Section 15: Replaced position indicator with over torque protector.
4	12/20/94	M. Lavery	Section 8: Added size & location requirements for casting markings. Section 13: Stuffing Box Section deleted from Specification. Section 14: Added worm gear operator. Section 17 and 18: Revised coating requirements and its testing. Section 20: Modified 300 psi hydrostatic test requirement. It is now to be performed after valve is fully assembled. Section 22: Added section for Shop Drawing Review
5	1/27/98	M. Lavery	Section 14: Added requirements for blend of grease and manufacturer to assure fasteners will not loosen during shipping.
6	12/15/98	M. Lavery	Section 9: Added requirements for retainer glands to be supplied for mechanical joint ends on each valve.
7	9/5/2000	M. Lavery	Section 10: Added option to provide rubber seats on the disc as well as in the body.

8	6/29/2007	F. Mawson	Section 14: Removed requirements for HBC Limitorque worm gear operator. Removed requirements for specified number of turns for worm gear and traveling nut operators.
---	-----------	-----------	---



STREET LEVEL OVERTORQUE PROTECTOR

DRAWN BY: T. KAUFMANN
CHECKED BY: M. LAVERY

DATE: 8-93

PAGE NO. 1 of 1