

**SPECIFICATIONS - DETAILED PROVISIONS**  
**Section 13446 - Valve and Gate Operations**

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**SECTION 13446  
VALVE AND GATE OPERATIONS**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Section Includes: Valve and gate operators, handwheel operators, bench stands, floor stands, accessory equipment and floor boxes, and key operated valves.

1.02 REFERENCES

- A. Aluminum Association (AA):
  - 1. DAF-45 -Designation System for Aluminum Finishes.

1.03 SUBMITTALS

- A. Shop Drawings: Include shop drawings for hydraulic gate lifts with shop drawings for gates as integrated units.

1.04 QUALITY ASSURANCE

- A. Provide valve operators integral with valve or gate, except for T-wrenches or keys, and portable operators intended to operate more than one (1) valve.
- B. Provide similar operators by one (1) manufacturer.
- C. Provide gates and hand operating lifts by one (1) manufacturer.
- D. Provide hydraulic gate lifts by one (1) manufacturer.
- E. Provide hydraulic valve operators and motorized operators by one (1) manufacturer.

1.05 MAINTENANCE

- A. Extra Materials:
  - 1. Key Operated Valve Keys or Wrenches:

Revised 12/12

- a) Furnish a minimum four (4) keys with 4-foot shafts and 3-foot pipe handles or wrenches with 4-foot shafts and 3-foot handles for operating key operated valves.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS

- A. Valve and Gate Operators:
  - 1. Stem Covers: Aluminum pipe; threaded cap on top; bolted aluminum flange on bottom; 1 by 12-inch slots cut at 18-inches on center in front and back of pipe; capable of covering threaded portion of greased stems that project above operators when gates or valves are opened or closed.
  - 2. Stem Cover Flanges, Pipes and Caps: Etched and anodized to produce chemical finishes in accordance with AA C 22, medium matte finish, and AA A 41 clear anodic coating, or described in AA publication 45, after fabrication.
  - 3. Gate Stem Covers: Concentric with stem.
  - 4. Position Indicators: Tail rods on hydraulic cylinders, or dial indicators with clear full-open and closed position indicators, calibrated in number of turns or percentage of opening.
  - 5. Manual or Power Operator Size: Sized to deliver maximum force required under most severe specified operating condition, including static and dynamic forces, seat and wedge friction, and seating and unseating forces with safety factor of five (5), unless otherwise specified.
  - 6. Operator Size: Capable of supporting weight of suspended shafting unless carried by bottom thrust bearings; shaft guides with wall mounting brackets.
  - 7. Provisions for Alternate Operation: Where specified or indicated on the Drawings, position and equip crank or handwheel operated geared valve operators or lifts for alternate operation with tripod mounted portable gate operators.
  - 8. Operation: Counterclockwise to open with suitable and adequate stops, capable of resisting at least twice normal operating force to prevent overrun of valve or gate in open or closed position.
  - 9. Open Direction Indicator: Cast arrow and legend indicating direction to rotate operator on handwheel, chain wheel rim, crank, or other prominent place.
  - 10. Buried Operator Housing: Oil and watertight, specifically designed for buried service, factory packed with suitable grease, completely enclosed space between operator housing and valve body so that no moving parts are exposed to soil; provide operators with 2-inch square AWWA operating nut.

11. Worm Gear Operators: Provide gearing on worm gear operators that is self-locking with gear ratio such that torque in excess of 160 foot-pounds will not need to be applied to operate valve at most adverse conditions for which valve is designed.
12. Traveling Nut Operators: Capable of requiring maximum 100 foot-pounds of torque when operating valve under most adverse condition; limit stops on input shaft of manual operators for fully open and closed positions; non-moving vertical axis of operating nut when opening or closing valve.

B. Handwheel Operators:

1. Manufacturers: One of the following or equal:
  - a) Rodney Hunt Company
  - b) Waterman Industries, Incorporated
  - c) H. Fontaine
2. Mounting: Floor stand or bench stand.
3. Bearings above and below Finished Threaded Bronze Operating Nut: Ball or roller.
4. Wheel Diameter: Minimum 24-inch.
5. Indicator: Counterclockwise opening with arrow, and word OPEN cast on top of handwheel indicating direction for opening.
6. Pull to Operate: Maximum 40 pounds pull at most adverse design condition.
7. Stem Travel Limiting Device: Setscrew locked stop nuts above and below lift nut.
8. Grease Fittings: Suitable for lubrication of bearings.

C. Hand-cranked Geared Operators:

1. Type: Single removable crank; fully enclosed.
2. Mounting: Floor and bench stand.
3. Operating Nut: When scheduled for portable operators.
4. Geared Lifts: 2-speed with minimum ratio of 4 to 1.
5. Teeth on Gears, Spur Pinions, Bevel Gears, and Bevel Pinions: Cut.
6. Lift Nuts: Cast manganese bronze.

7. Exterior Surfaces on Cast-Iron Lift Parts: Smooth.
8. Bearings above and below Flange on Lift Nuts: Ball or roller; capable of taking thrust developed by opening and closing of gates under maximum operating head; with bronze sleeve bearings and sufficient grease fittings for lubrication of moving parts, including bearings and gears.
9. Crank Rotation Indicator: Cast arrow with word OPEN in prominent location readily visible indicating correct rotation of crank to open gate.
10. Hand Cranks: 15-inch radius; requiring maximum 25 pounds pull to operate gate at maximum operating head; with:
  - a) Revolving brass sleeves
  - b) Gears, spur pinions, bevel gears, and bevel pinions with cut teeth
  - c) Cast manganese bronze lift nuts
  - d) Cast-iron lift parts with smooth exterior surfaces
11. Indicator: Dial position type mounted on gear operator; enclosed in cast-iron or aluminum housing with clear plastic cover; marked with fully open,  $3/4$ ,  $1/4$ , and closed positions.

D. Floor Boxes:

1. Manufacturers: One of the following or equal:
  - a) Waterman industries, Inc.
  - b) \_\_\_\_\_
2. Floor Boxes: Cast-iron; with:
  - a) Counter type indicator valve
  - b) Hinged, lockable lid with directional arrow
  - c) 2-inch square AWWA operating nut

E. Floor Stands:

1. Manufacturers: One of the following or equal:
  - a) Rodney Hunt Company
  - b) Waterman industries, Inc
  - c) H. Fontaine

Revised 12/12

Floor Stand Assemblies: Heavy-duty cast-iron, suitable for mounting specified operator.

F. Bench Stands:

1. Bench Stands: Handwheel operators or hand crank, geared operators conforming to hand-cranked geared operator requirements, except capacity to be mounted on haunch, wall bracket, or self-contained gate yoke.

G. Accessory Equipment:

1. Wall Brackets or Haunches: As indicated on the Drawings.
2. Stems: Stainless steel; sized to match output of operator; minimum gate or valve operating stem diameter; maximum 200 slenderness ratio.
3. Stem Couplings: Stainless steel; internally threaded to match stem; lockable to stem by set screw.
4. Stem Guides: Cast-iron with silicon bronze bushing; maximum 200 slenderness ratio; capable of being mounted with wall bracket; adjustable in two directions.
5. Wall Brackets: Cast-iron, capable of withstanding output of operator, adjustable in two directions.
6. Stem Stuffing Boxes: Cast-iron, with adjustable gland and packing.
7. Fasteners and Anchor Bolts: 316 stainless steel.
8. Geared Valve Operators: Provided with cut gears, either spur or worm; sized to operate valves at most adverse design condition; with maximum 40 pound pull at handwheel or chain wheel rim.
9. Geared Valve Traveling Nut Operators: Acceptable only where specified or indicated on the Drawings.
10. Accessory Equipment for Valves and Gates Requiring Remote Operators: Operating stems, stem couplings, stem guides, wall brackets, and stem stuffing boxes.

**PART 3 • EXECUTION**

3.01 INSTALLATION

- A. Install floor boxes in concrete floor with lid flush with floor.
- B. After installation of gate and stem covers, mark stem covers at point where top of stems are at full-open position and at closed position.
- C. Attach floor stand to structure with anchor bolts
- D. Install stem stuffing boxes where operating stems pass through intermediate concrete floor slabs.

3.02 SCHEDULES

- A. Provide Geared Operators for Following Valves:
  - 1. Butterfly valves larger than 6-inches, nominal size, on liquid service.
  - 2. Butterfly valves larger than 10-inches, nominal size, on gas and air service.
  - 3. Plug valves 6-inches, nominal size, and larger.
- B. Provide handwheel operators for valves mounted 6 feet or less above floors.
- C. Provide chain wheel operators for valves mounted more than 6 feet to center line above floors.

**END OF SECTION 13446**