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| --- | --- | --- |
| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | September 22,2009 | Review/update of the document “Related Sections” |
| 3 | February 18, 2010 | Approved manufacturers inserted in text |
| 4 | April 8, 2013 | First Draft – Consolidated Comments Spec Update Project |
| 5 | June 17, 2013 | Finalized for Legal Review. Incorporation of new Commissioning and Computerized Maintenance Management System Data Requirements Specification cross references. |
| 6 | May 20, 2014 | Revised to incorporate Legal Services’ comments (AV) |
| 7 | July 15, 2014 | Amended to reflect changes related to commissioning specification and name change (AV) |
| 8 | September 24, 2014 | Updated, Finalized Specification – Reference eDOCS #1029443-v6 (AV) |
| 9 | February 11, 2015 | Updated standards and corrections (AV) |
| 10 | March 2, 2015 | Updated, Finalized Specification – Legal Reference eDOCS #5043346 V12 (AV) |
| **11** | **March 18, 2016** | **Updated AWWA Specification** |
| 12 | November 11, 2016 | Updated NEMA MG-1 reference to 2016 new version (AV) |
| 13 | January 30, 2017 | Updated Acceptable Manufacturers to be consistent with other specifications (CDP PMO) |
| 14 | March 1, 2017 | Updated references for NSF 372 (AV) |
| 15 | June 13, 2022 | 2.3.7 Revised tagging requirements (BM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

**Notice:** This Document hardcopy must be used for reference purpose only.

**The on-line copy is the current version of the document.**

# GENERAL

## Related Sections

[Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.

Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.

This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]

[List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

### [List Sections specifying products installed but not supplied under this Section and indicate specific items.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

### [List Sections specifying related requirements.]

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

### Summary of Applicable Cross Referenced Sections:

#### Section 01080 – Process Equipment Location Tagging

#### Section 01250 – Substitutions

#### Section 01425 - Computerized Maintenance Management System Data Requirements

#### Section 01600 – Material and Equipment

#### Section 01640 – Manufacturer’s Services

#### Section 01810 – Equipment Testing and Facility Commissioning

#### Section 01820 – Demonstration and Training

#### Section 05500 – Metal Fabrications General

#### Section 09900 – Painting and Protective Coatings

#### Section 11010 – Equipment General Requirements

#### Section 16260 - AC Induction Motors

#### Section 16220 – Low Voltage Adjustable Frequency Drive Systems

#### Division 13 - SCADA and Instrumentation (applicable specifications)

## References

### Comply with the latest edition of the following codes, standards and all amendments thereto:

#### American Society for Testing and Materials (ASTM):

##### ASTM A126-04(2014), Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

##### ASTM A193/A193M-16, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High pressure Service and Other Special Purpose Applications.

##### ASTM A276/A276M-16a, Standard Specification for Stainless Steel Bars and Shapes.

##### ASTM B21/B21M-14, Standard Specifications for Naval Brass Rod, Bar, and Shapes.

##### ASTM B584-14, Standard Specification for Copper Alloy Sand Castings for General Applications.

##### Other ASTM Standards as applicable and cited in AWWA C561-14.

#### American Water Works Association (AWWA):

##### AWWA C560-14, Cast-Iron Slide Gates.

##### AWWA C541-08, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.

##### AWWA C542-09 Electric Motor Actuated Devices for Valves and Slide Gates

#### Joint Industry Conference (JIC): Standards for Hydraulic Cylinders.

#### NSF/ANSI

##### NSF/ANSI 60

##### NSF/ANSI 61

##### NSF 372-2011 Drinking Water System Components – Lead Content

#### National Electrical Manufacturers Association (NEMA):

##### NEMA 250-20-14, Enclosures for Electrical Equipment (1,000 Volts Maximum).

##### NEMA MG 1-2016, Motors and Generators.

##### NEMA Type 7 or Type 8 enclosures as required.

## Definitions

### Submersible: The ability to exclude water when submerged under a 6 metre head of freshwater for 24 hours and still maintain electrical integrity.

### Slenderness Ratio: The ratio of maximum unsupported stem [and cylinder rod] length to stem [or rod] ASTM A193/A193M-16 cross-section radius of gyration.

### Self Contained: The arrangement of gate operator, supported by gate frame, such that operating thrust loads are not applied external to gate assembly.

## Submittals

### Shop Drawings:

#### Equipment Assembly: Provide the make, model, weight, [kW and horsepower] of each equipment assembly and all other required information as detailed in the equipment information template in a format that is electronically suitable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 – Computerized Maintenance Management System Data Requirements.

#### All equipment information shall be primarily expressed in SI units, with imperial units as a secondary unit cited.

#### Manufacturer’s catalog information, descriptive literature, specifications, dimensional layouts, and identification of materials of construction.

#### Detailed [structural,] [mechanical,] [and] [electrical] drawings showing equipment fabrications and interface with other items. Include dimensions, size, and locations of connections to other work, and weights of associated equipment.

#### Gate opening and closing thrust forces that will be transmitted to support structure with operator at extreme positions and load.

#### Gate operator and stem calculations for each gate and service condition.

#### [External utility requirements such as air, water, power, and drain for each component.]

#### [Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.]

#### [Power and control wiring diagrams, including terminals and numbers.]

#### [Shop performance test procedures.]

#### All equipment data shall be provided in accordance with Section 01425 - Computerized Maintenance Management System Data Requirements.

### Information Submittals:

#### Manufacturer’s Certificate of Compliance for materials.

#### Special shipping, storage, protection and handling instructions.

#### Manufacturer’s installation instructions.

#### Routine maintenance requirements prior to plant startup.

#### Manufacturer’s Certificate of Proper Installation.

#### Operation and Maintenance Manual.

#### [Service records for maintenance performed during construction.]

#### Test Procedures and field leakage test reports in accordance with AWWA C560-14.

#### Affidavit of Compliance in accordance with AWWA C560-14 for all applicable components.

#### All information (including data for lubricants) shall also be provided in an electronic format suitable for uploading to the Region’s CMMS (Maximo). Refer to Section 01425 - Computerized Maintenance Management System Data Requirements.

## Extra Materials

### Furnish, tag, and box for shipment and storage following spare parts and special tools. Provide a list of special tools required with details for use or cross-reference to the O&M manuals and in a format upload-able to the Region’s CMMS (Maximo).

|  |  |
| --- | --- |
| Item | Quantity |
| Stem collars for gate stems | **[1] [     ]** of each different size |
| Bronze lift nuts | **[1] [     ]** of each different size |
| Indicator lights | **[1] [     ]** dozen |
| Special tools required to maintain or dismantle | **[1] [     ]** complete set |

### Delivery: [In accordance with Section 01600 - Material and Equipment.]

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

### The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

### All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

### If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.]

# PRODUCTS

## Supplements

### Refer to the supplements to this Section for additional Product information.

## Sluice Gates

### General:

#### [Unless otherwise specified in the Contract Documents,] conform to AWWA C560-14, rising stem type.

#### Leakage testing and verification in accordance with AWWA C560-14 Section 5.

#### Minimum Acceptable Casting Thickness for Cast Iron Components: 19 mm.

### Wall Thimbles:

#### Cast iron, one-piece construction, in accordance with ASTM A126-04(2014), Class B. Depth of thimble shall be a minimum of 300 mm.

#### Cast centre ring or water stop around periphery.

#### Front Flange: Machined, with tapped holes for sluice gate frame attaching studs.

#### Stamp vertical centre lines of metal with the word “top.”

#### Furnish permanent gasket of uniform thickness or mastic [suitable for contact with potable water] [suitable for contact with wastewater] between sluice gate frame and thimble.

#### For large rectangular thimbles, furnish holes in invert to allow concrete placement under thimble. Space holes so that unvented invert length does not exceed 600 mm.

#### Coordinate sluice gate manufacturer and the thimble fabricator for required bolt hole size and pattern for connection to sluice gate thimbles.

### Frames:

#### Cast iron one-piece construction, in accordance with ASTM A126-04(2014), Class B.

#### Machine contact surfaces:

##### Machine dovetailed grooves on front face, into which seat facings shall be driven and machined.

##### Machine back flange to bolt directly to a machined face of wall thimble cast in concrete.

#### For frames with top and bottom wedges, furnish integrally cast pads machined with keyways to receive wedge seats.

#### Where side clearance is limited, flanged frames may require mounting holes to be drilled through to front face of frame.

### Discs:

#### Cast iron, one-piece construction with integrally cast vertical and horizontal ribs in accordance with ASTM A126-04(2014) Class B.

#### Machine dovetailed grooves on seating face, into which seat facings shall be driven and machined.

#### Wedge Pads: Integrally cast on disc and machined to receive adjustable wedges.

#### Cast a heavily reinforced nut pocket integrally on vertical centreline above horizontal centreline to receive thrust nut.

#### Compliant with NSF 372.

### Guides:

#### Cast iron, one-piece, in accordance with ASTM A126-04(2014) Class B, designed to withstand total thrust from water pressure and wedging action.

#### Machine contact surfaces.

#### Length: Sufficient to retain and support the entire sluice gate disc in fully OPEN position.

#### Attach to frame with ASTM A276/A276M-16a or ASTM A193/A193M-16, Type [304] [316] stainless steel studs; dowel to prevent relative motion between guides and frame or cast guides integrally with frame.

#### Securely attach wedge seats to machined pads on guides.

### Wedges and Seat Facings:

#### Side wedges for all conditions. [Top and bottom wedges for unseating heads as necessary to meet leakage requirements.]

#### Solid cast in accordance with ASTM B584-14, Alloy 865 manganese bronze.

#### Machine contact surfaces. Key to cast iron pads to prevent rotation or lateral motion.

#### Attach wedges to disc in accordance with ASTM A276/A276M-16a, Type [316] [304] stainless steel studs and nuts.

#### Seat Facings: in accordance with ASTM B21/B21M-14, Alloy B, shaped to fill and permanently lock in machined dovetail grooves when pneumatically impacted into place. Attaching pins and screws not permitted.

#### Compliant with NSF 372.

### Stems:

#### [25] [ ] mm minimum diameter, in accordance with ASTM A276/A276M-16a, Type [316] [304] stainless steel.

#### Threads: Acme type with RMS surface roughness of 0.0016 mm or less on flanks for manually operated gates and 0.008 mm or less on flanks for electrically operated gates. Extend threaded portion of stem [50] [ ] mm above operator when gate is in CLOSED position.

#### Couplings:

##### Use when stems have more than one section.

##### Use same material as stem.

##### Furnish with internal threads that transmit full thrust of stem.

##### Hold in place on stem with bolts or keys and keyways.

##### Same size and interchangeable.

#### Size so that the ratio of the unsupported stem length (L) to the radius of gyration (r), both in mm, does not exceed [200.] [ .]

#### Withstand in compression, without damage, thrust equal to a minimum of [2.5] [ ] times rated output of hoisting mechanism, with a 12 daN effort applied to hand-wheel or crank.

#### Electric motor-driven floor stands to withstand at least [1.25] [ ] times output thrust of motor in stalled condition.

#### Actuated by hydraulic cylinders to withstand at least [1.25] [ ] times output of hydraulic cylinder with pressure at pressure relief valve setting.

#### Cast iron, bushed stem guides, mounted on cast iron brackets, adjustable in two directions and spaced so that L/r ratio does not exceed [200.] [ .]

#### Adjustable stop collar for CLOSED position.

### Stem Covers:

#### Transparent plastic, vented pipe stem cover and cap.

#### OPEN/CLOSED designators [and with 25 mm graduations] and numerals 1/4, 1/2, 3/4 engraved on guard. Engraving shall be at least 25 mm high and 3 mm wide.

#### For applications where process fugitive emissions are hazardous to the environment (for example chlorine fumes), the stem cover shall be sealed or vented back to process.

### Flush-Bottom Closure Seals:

#### Compressible Resilient Seal:

##### Attached to bottom of disc with a bronze or stainless steel bar and bronze or stainless steel fasteners.

##### Specially molded shape designed to fit a lip machined on bottom rib of disc.

##### Shaped to produce a wide sealing area on a machined cast iron stop bar, bolted and keyed to gate frame to form a flush invert.

##### Differential sealing pressure of resilient seal on stop bar shall be variable by adjustment of side wedges on gate.

#### Alternative Closures:

##### Solid, square-cornered, resilient rubber seal in place of bottom dovetail facing and wedging devices.

##### Securely fastened to bottom cross member of frame on a stop plate, with a retainer bar and stainless steel fasteners.

##### Make top surface of seal flush with invert of gate opening.

##### Machine full length of bottom edge of disc accurately to make contact with seal when disc is closed.

### Acceptable Manufacturers:

##### Dynamic Water Control Gates Inc.

##### Fontaine Industries Ltd.

##### Armtec Infrastructure Inc.

##### Orbinox Canada

##### Approved Equivalent.

## Operators

### General:

#### Components: Withstand a minimum of 250 percent of design torque or thrust at extreme operator positions without damage.

#### Sizing: Include hydraulic down-pull load for heads greater than 10 metres and for nominal gate widths greater than 1.5 metres.

#### Gear train and gate stem sections shall produce a self-locking drive train.

#### Lift Nuts: Internally threaded with cut or cold-rolled Acme threads corresponding to stem threading.

#### Roller Bearings: Ball-thrust or tapered above and below lift nut to support both opening and closing thrusts.

##### Grease lubrication fittings for bearings.

##### Input pinions with needle or ball bearings.

#### Lubrication: Furnish rising stem gates with an insert lubricator flange in lift, with grease fitting for greasing stem threads below stem nut.

##### Grease to be NSF 60 approved if potential for coming in contact with potable water process exists.

##### All greases/lubricants to be supplied with MSDS.

##### For potable water applications - operator pedestal to be sealed to the floor or floor contact area to be within a berm in order to prevent liquid spills from entering the process.

#### Manual Operator Limit Switches:

##### Mounted on an angle adjacent to stem and actuated through limit switch wands by stop collar.

##### Single-pole, double-throw type, with contacts rated 5 amps at 120V AC.

### Type 1, Manual, Hand-wheel-Operated Floor Stands:

#### Manual Effort: Not to exceed 18 kg.

#### Hand-wheel: Directly drive a replaceable bronze stem nut for a rising gate stem, bearing mounted on a cast iron pedestal and base.

### Type 2, Manual, Geared Floor Stands and Offset Stands:

#### Crank-operated, with weatherproof housings and solid bronze lift nut mounted on high-strength cast iron pedestal or base.

#### Manual Effort: Not to exceed 18 kg.

#### Suitable for portable electric drill operation after removal of hand crank. Furnish one adapting chuck to fit sluice gate operators and to fit electric drill operators.

### Type 3, Electric Motor Operators:

#### Description: 710 mm high steel pedestal, totally enclosed weatherproof electric drive unit, and a totally enclosed gear box that operates a two piece, bronze stem nut, which lifts gate stem.

#### Gears:

##### Heat treated alloy steel, supported throughout by antifriction ball or roller bearings and grease lubricated.

##### Operate on hammer-blow principle for starting of operation.

#### Limit and Torque Switches:

##### Automatic double-acting, geared directly to operating gear train and “in step” at all times, whether in motor or manual operation.

##### Wire limit switches internally to stop motor at fully OPEN and fully CLOSED positions.

##### Wire torque switches internally so that, in event of a mechanical overload in either direction, motor will be stopped.

#### Hand-wheel:

##### Side mounted.

##### Include an automatic clutch to positively disengage hand-wheel when drive motor control is energized.

##### Design hand-wheel operator so that the failure of motorized gearing will not prevent hand operation of gate.

#### Drive Unit: Electric motor as specified on the Induction Motor Data Sheet (attached as a supplement to this Section) with integral OPEN/STOP/CLOSE weatherproof pushbuttons, reversing controller, [575/120] [     ] volt control power transformer, space heaters in motor, space heaters in limit switches and in control compartments, mechanical dial type position indicator, and transparent plastic pipe stem cover and cap [unless otherwise specifically noted on Drawings.]

##### [Furnish motor enclosure with drainage and breathing holes.] [Furnish motor and control compartment enclosures rated as submersible.]

##### Self-locking, with 0.3 metre per minute gate travel speed, and a rated running torque equal to 20 percent of motor starting torque at a rated running time of [15] [5] minutes, without exceeding allowable NEMA temperature rise for insulation class used.

##### Duty cycle that is suitable for the designed operating frequency.

#### Operation: Drive gate to its fully OPEN or CLOSED position when OPEN or CLOSED pushbutton is depressed momentarily. Motor shall stop in mid-travel when STOP button is depressed.

#### Remote Position Indication: Integral position transmitter producing a 4 to 20 mA DC output in direct proportion to gate position for connection to an external instrument loop. Fully CLOSED position shall correspond to 4 mA DC. Transmitter shall be capable of driving a minimum external load impedance of 350 ohms. Telemetered data shall be in accordance with the operational requirements set out in Division 13 - SCADA and Instrumentation and the Process Narratives/Process Control Narratives included in the SCADA appendices.

### Electric Controls:

#### Feature A: Local OPEN/STOP/CLOSE pushbutton station.

#### Feature B: End position limit switches; OPEN and CLOSED position switches shall be normally open contacts that close at end position; contacts shall be dry and rated for 5 amps at 120V AC.

#### Feature C: Continuous position output; furnish a signal converter to generate a 4 to 20 mA DC signal to an external loop in direct proportion to gate position; signal converter shall be factory mounted in a NEMA, Type 4 enclosure or, depending on the installation location, NEMA Type 7 or 8 enclosure as required.

#### Feature D: LOCAL/REMOTE weatherproof selector switch and provisions for remote OPEN/STOP/CLOSE operation; remote commands will be by way of a four-wire circuit, as shown; motor operator shall impress voltage required to read these contacts and shall go to commanded position or stop when in REMOTE mode.

#### Styles:

##### Style 1: Includes control Feature A only.

##### Style 2: Includes control Features A and B.

##### Style 3: Includes control Features A, B, C, and D.

### Type 4: Hydraulic Cylinder Operators:

#### Conform to JIC Standards. Include rod end and square plate floor mounts.

#### Cylinder Rods: in accordance with ASTM A276/A276M-16a, Type 316 stainless steel with hard chrome plating.

##### Furnish stop tubes to prevent excessive bearing side loads with extended rod.

##### Size rods for a slenderness ratio not greater than 160.

#### Cushion cylinders at both ends and have a rubber boot completely covering that part of rod which enters cylinder.

#### Removable plugs at top of cylinders for venting air during filling.

#### Operating Pressure Rating: [21,000] [ ] kPa. At a pressure of [12,250] [ ] kPa, cylinders shall have a minimum safety factor of 4, based on yield strength of materials. Actual operating pressures are listed on the Sluice Gate Schedule (attached as a supplement to this Section).

#### Internal Leak Rate at Required Load and Pressure: Shall not exceed [25] [ ] mm of the cylinder rod length per 24 hours.

#### Factory installed gate position linear displacement transducers and proximity switches.

#### Linear Displacement Transducer Sensor:

##### Sealed waterproof stainless steel unit threaded into cylinder; leak-proof to 21,000 kPa.

##### Torroidal magnet mounted on piston to determine position of piston.

##### Frictionless operation and no data loss on power interruption.

##### High linearity (0.05 percent), analog output of 4 to 20 mA DC, zero-trim fine adjustment.

##### Electronics operate continuously at 30 to 83 degrees Celsius.

##### Factory mutual approved safety barriers for explosion-proof operation and water-submersible service.

##### Power Supply: 120V ac, single-phase, 60 Hz.

##### Acceptable Manufacturers:

##### .1 Temposonics, Inc.

##### .2 Approved Equivalent.

### Identification Tagging Requirements:

#### Tagging to be in accordance with Section 01080 – Process Equipment Location Tagging bearing the gate tag number shown in the Sluice Gate Schedule (attached as a supplement to this Section) for each gate operator.

#### Attach tags to the gate operator by soldered split key rings so that ring and tag cannot be removed.

### Portable Electric Drill Gate Operators:

#### Furnish [ ,] 115 volt, single-phase, 60 Hz, heavy-duty universal electric drills, complete with overload release clutch and lightweight, adjustable tripod, support assemblies.

#### Suitable for operating sluice gates specified in this Section.

#### Complete with adapting chuck to fit gate operator shafts, a 7 metre electrical cord and grounding plug with a weatherproofing cover, and reversing switch.

##### Plug: Shall be in accordance with [Twist-Lock NEMA Configuration L5 30P.] [ .]

#### Capable of delivering a minimum of 68 Nm of torque and shall maintain a minimum speed of 60 rpm under full load conditions.

#### Motors: Suitable for 15 minute operation under full load when rested for same period of time between operations.

## Appurtenances

### Lifting Lugs: Furnish suitably attached lifting lugs for equipment assemblies and components weighing over 45 kg (if not already part of such assemblies and components).

### Anchor Bolts: in accordance with ASTM A193/A193M-16, Type 316 stainless steel [sized by equipment manufacturer] at least 13 mm in diameter, or as shown, and as specified in Section 05500 - Metal Fabrications General.

## Shop/Factory Finishing

### Coatings:

#### Sluice Gate: Factory prepare, prime, and finish coat exposed metal surfaces [with manufacturer’s standard coating] [for sewage service] [in accordance with Section 09900 - Painting and Protective Coatings.]

#### Thimble: Coat embedded surfaces of thimble in accordance with Section 09900 - Painting [and Protective Coatings].

#### Ensure coatings are suitable for potable water applications and are NSF certified as required.

## Source Quality Control

### Factory Tests and Adjustments: Ensure that sluice gates [and] [control panels], including the motor[s] are fully assembled and tested at the factory. In the event that it is not possible to fully assemble and test these items at the factory, the Contractor shall seek written approval from the [Consultant for any alternate arrangement.

#### Functional Test: Perform [manufacturer’s standard,] [ ] [motor] test on [equipment.] [ .]

#### Performance Test: In accordance with [AWWA C560-14, AWWA C541-08 and AWWA C542-09 as applicable.] [     .]

# EXECUTION

## Installation

### In accordance with manufacturer’s written instructions.

### Accurately place anchor bolts using templates furnished by the manufacturer and as specified in Section 05500 - Metal Fabrications General.

### Wall Thimbles:

#### Brace internally during concrete placement.

#### Provide for installing sluice gates. Direct bolting to concrete walls is not acceptable.

#### Where sluice gate thimbles and pre-stressed concrete cylinder pipe (PCCP) are embedded in a common wall then bolt thimbles to flange ring of PCCP wall pipe section. Bolting shall be adequate to prevent wall pipe-thimble assembly from separating or shifting during concrete placement.

### Grease threads above stem nut prior to placing gate in operation.

### Provide two removable stationary jacks sized to secure a slide gate in the full open position while people travel through the gate for safety reasons (installation/maintenance activities in a de-watered structure).

## Field Quality Control

### Functional Tests: Conduct on each sluice gate.

### Performance Test:

#### Conduct performance testing on each sluice gate under actual or approved simulated operating conditions.

#### Test for a continuous [3 hour] period without malfunction.

#### Confirm valve position is telemetered to the SCADA system (as required).

#### Adjust, realign, or modify units and retest if necessary.

#### Leakage shall not exceed 1.24 liter per minute per metre of gate periphery under either seating or unseating head conditions.

#### Performance test and leakage test reports shall be submitted to the Consultant for approval and to the Region for sign-off.

### Commissioning shall be performed in accordance with Section 01810 – Equipment Testing and Facility Commissioning.

## Manufacturer’s Services

### Manufacturer’s Representative: The Contractor shall ensure that the manufacturer’s representative will be present at Site or classroom designated by the [Region] for the minimum number of Person-days listed below, travel time excluded:

#### [ ] Person-days for [installation assistance] [and] [inspection.]

#### [ ] Person-days for [functional] [and] [performance] testing and completion of the Manufacturer’s Certificate of Proper Installation.

#### [ ] Person-days for pre-startup classroom or site training.

#### [ ] Person-days for facility startup.

#### [ ] Person-days for post-startup training [of the Region’s personnel.] [Training shall not commence until an accepted detailed lesson plan for each training activity has been reviewed by the Consultant].

#### See Section 01820 – Demonstration and Training.

### See Section 01640 - Manufacturers’ Services and Section 01810, Equipment Testing and Facility Commissioning.

## Supplements

### The supplements listed below form part of this Section.

#### Sluice Gate Schedule.

#### Induction Motor Data Sheet.

**END OF SECTION**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | SLUICE GATE SCHEDULE | | | | | | |
| **Gate Identification No. and Location** | **Gate Opening Width x Height (mm)** | **Acceptable Leakage Rate** | **Frame Type** | **Thimble Type and Thickness (mm)** | **Gate Invert Elevation and Type** | **Design Operating Head (metres) Seating/ Unseating Condition** | **Operator Type/Control Style** |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Legend: STD-Standard Invert Type FLUSH-Flush Bottom Invert Type | |  |  | | | | |

Table shall be provided in an electronic format suitable for upload to the Region’s CMMS (Maximo).

|  |  |
| --- | --- |
| INDUCTION MOTOR DATA SHEET | |
| Project: | |
| Region: | |
| Equipment Name: | |
| Equipment Tag Number(s): | |
| Type: Squirrel-cage induction meeting requirements of NEMA MG 1-2016 or as per Specifications | |
| Manufacturer: For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer | |
| Hazardous Location:  Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing mark | |
| Motor Horsepower: | Guaranteed Minimum Efficiency at Full Load:  percent |
| Voltage: | Guaranteed Minimum Power Factor at Full Load:  percent |
| Phase: | Service Factor (@ rated max. amb. temp.):  1.0  1.15 |
| Frequency: | Enclosure Type: |
| Synchronous Speed: rpm | Mounting Type:  Horizontal  Vertical |
| Multispeed, Two-Speed: | Vertical Shaft:  Solid  Hollow |
| /  rpm | Vertical Thrust Capacity (kg): Up  Down |
| Constant Horsepower | Adjustable Speed Drive: See Section 16260, Low Voltage |
| Variable Torque | Adjustable Frequency Drive Systems. |
| Constant Torque | Operating Speed Range:  to % of Rated Speed |
| Winding:  One  Two | Thermal Protection: |
|  | Space Heater:  volts, single phase |
|  | Oversize main terminal (conduit) box for motors |
|  | Terminal for connection of equipment grounding wire in each terminal box |
| Additional Motor Requirements:  See Section 16220, AC Induction Motors | |
| Special Features: | |
|  | |
| Data shall be provided in an electronic format suitable for upload to the Region’s CMMS. | |