

**Addendum  
No. 3**

Date: June 15, 2020  
Project: GSS Surplus and Fleet Services Renovation  
Project No: MJ1002000040

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The work herein shall be considered part of the bid documents for the referenced project and carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Acknowledge receipt of addendum on the bid form as indicated.

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**Requests for Information:**

1. **Question:** Please provide details and material specs for the following:
  - a) Gravel depth and type for Staging Area additional stone
  - b) Gravel Depth and type for Storage Trailers staging area**Response:** Gravel to be 6" deep GABC.
2. **Question:** Drawing A101 Note C5, can a specification be issued for drain cover?  
**Response:** Provide a 6" wide drain cover. Basis of design Zurn P6-GHPD.
3. **Question:** Will a New Castle Permit be required?  
**Response:** No, only a Smyrna Building Permit will be required.
4. **Question:** Will a Smyrna Permit be required?  
**Response:** A Smyrna Building Permit will be required.
5. **Question:** Will sub of subs have to be listed on the Bid Form?  
**Response:** Sub of subs must be listed on the Bid Form per the bid form.
6. **Question:** Can a manufacturer be issued for metal siding?  
**Response:** The existing metal siding appears to be Stormproof by MBCI. Removed panels from the demolished out-building can be reused for patching metal panel areas as well.
7. **Question:** It appears existing concrete floors are rough and appears they will need to be patched. Please advise.  
**Response:** Patch and repair concrete floors as required to a level and smooth finish as per specification section 09 05 61.
8. **Question:** Due to Interlogix door position switches being discontinued, is the GRI door position switch 195-12-W an approved substitution for the 1076CD-N?  
**Response:** This is approved.
9. **Question:** Door 110 is depicted on drawings as receiving a card reader but does not appear on door hardware schedule. Should this door receive a card reader and electric strike?  
**Response:** Door 110 shall have hardware set 09.

10. **Question:** Door 109 shows a quantity of 2 card readers on the door hardware schedule, but only 1 is depicted on the drawing. Can you confirm how many card readers this door should receive?  
**Response:** Only 1 card reader is needed at door 109.
11. **Question:** P3225-LV has been discontinued. The Axis Communications recommended replacement is P3245-LV. Is this an approved replacement?  
**Response:** This is approved.
12. **Question:** Drawings appear to be missing some devices. Should toilet 107 have strobe? Should file storage 109 have horn/strobe? Does Door 108C require a pull station?  
**Response:** A strobe is required in toilet 107. A horn strobe is not required in file storage 109. A pull station is required at door 108C.
13. **Question:** Are there any spec. for the Cable Tray & Ladder Rack? (ie) size, make, model# etc. Please advise.  
**Response:** For cable trays and ladder racks, refer to specification section 27 10 05 Structured Cabling for Voice and Data – Inside-Plant Paragraph 2.02 Pathways A, B, & C.
14. **Question:** E102 Site Lighting. Will rigid or pvc be required for the riser up the light pole?  
**Response:** Transition to galvanized steel rigid metal conduit where emerging from underground.
15. **Question:** Addendum #2, E101, Electrical ,Mechanical Power Plan. Room 108B, Shows a combo starter. Will the well contractor be supplying this starter? Spec is needed for this item.  
**Response:** The electrical contractor will supply and install the combo starter and will need to coordinate with the well contractor. Spec section 26 29 13 – Enclosed Controllers will be added.
16. **Question:** Is the new card access panel integrating with an existing one?  
**Response:** No
17. **Question:** Is the new intrusion panel integrating with an existing one or devices?  
**Response:** No
18. **Question:** In the Structured Cabling specification there is a certified contractor note, does our firm need to be on the certified contractors list to participate on this contract?  
**Response:** For all IT infrastructure work the contractor needs to be certified by the state to participate in this contract.

#### **Changes to Drawings:**

1. Drawing M-101 Mechanical Plans –

- a. Relocated garage sensors.
  - b. Deleted electric baseboard heater in utility room.
  - c. Added electric unit heater in utility room.
2. Drawing E-101 Electrical Plans –
    - a. Added a strobe to toilet rm 107.
    - b. Added a pull station to door 108C.
    - c. Added receptacles to the boiler rm 108A for the water softener system, sediment filter, and chlorination system.
    - d. Added (4) type D light fixtures to the warehouse 108 and boiler 108A rooms. Deleted the type F light fixture in boiler 108A.
    - e. Deleted the circuit to EBB-3 in boiler 108A. Added a circuit to EUH-1 in boiler 108A.
  3. Drawing AD101 – Demolition Plans
    - a. Added demolition of existing slab for under slab plumbing. See sketch ASK-03
  4. Drawing A-101 – Construction Plans
    - a. Added new concrete slab infill for under slab piping trench locations. Increased the size of the boiler room footprint and the size of the double doors. See sketch ASK-02.
  5. Drawing P-000 - Plumbing Cover Sheet
    - a. Added Revised Well Tank Diagram
  6. Drawing P-101 – Plumbing Plans
    - a. Removed Well Tank Diagram
    - b. Added Water Treatment System to Closet for Well Water Treatment
    - c. Moved Utility Sink P-4

#### **Changes to Specifications:**

1. 22 30 00 Plumbing Equipment – Added water treatment equipment and water treatment scope of work including one year domestic water maintenance service which is to be included in the contractor’s base bid price.
2. 33 11 13 Potable Water Supply Wells – Deleted pH neutralization system from this specification.
3. 08 71 00 Door Hardware – Part 3 section 3.8 Door Hardware Schedule
  - a. Removed door 108A from hardware set 05.
  - b. Added doors 104 and 103 to hardware set 07.
  - c. Added door 110 to hardware set 09.
  - d. Added door hardware set 10 – Double Door. HM Door and HM Frame for door 108A.
4. 20 29 13 Enclosed Controllers – Added to specs.

#### **Attachments:**

1. 22 30 00 Plumbing Equipment
2. 33 11 13 Potable Water Supply Wells

3. 08 71 00 Door Hardware
4. 26 29 13 Enclosed Controllers
5. ASK-02
6. ASK-03
7. M-101
8. P-000
9. P-101
10. E-101

END

**SECTION 08 71 00  
DOOR HARDWARE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Commercial door hardware for the following:
    - a. Swinging doors.
- B. Related Sections include the following:
  - 1. Division 8 Section "Steel Doors and Frames"
  - 2. Division 8 Section "Aluminum Entrances and Storefronts"

1.3 SUBMITTALS

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Qualifications: Submit manufacturer's qualifications.
- C. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- D. Shop Drawings: Details of electrified door hardware, indicating the following:
  - 1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:
    - a. System schematic.
    - b. Point-to-point wiring diagram.
    - c. Riser diagram.
    - d. Elevation of each door.
  - 2. Detail interface between electrified door hardware and access fire alarm, control, and security building control system.
- E. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.

1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
- F. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
    - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
      - 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
  5. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.
- G. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- H. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

- I. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
  - 1. Include lists of completed projects with project names and addresses of architects and owners, and other information specified.
- J. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
- K. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
- L. Warranties: Special warranties specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- B. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
  - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.
- C. Regulatory Requirements: Comply with provisions of the following:
  - 1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, FED-STD-795, "Uniform Federal Accessibility Standards," as follows:
    - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
    - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
      - 1) Interior Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
      - 2) Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
      - 3) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
    - c. Thresholds: Not more than 1/2 inch (13 mm) high, Not more than 3/4 inch (19 mm) high for exterior sliding doors. Bevel raised thresholds with a slope of not more than 1:2.
  - 2. NFPA 101: Comply with the following for means of egress doors:

- a. Latches, Locks, and Exit Devices: Not more than 15 lbf (67 N) to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
  - b. Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds.
  - c. Door Closers: Not more than 30 lbf (133 N) to set door in motion and not more than 15 lbf (67 N) to open door to minimum required width.
  - d. Thresholds: Not more than 1/2 inch (13 mm) high.
3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- D. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
1. Test Pressure: Test at atmospheric pressure.
- E. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for key control system.
  4. Address for delivery of keys.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."
- G. All Electric Door Hardware shall be furnished and installed by the General Contractor. All Electric Door Hardware shall be wired by the Electrical Contractor. Both the Electrical & General Contractor shall meet and coordinate all work before proceeding.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to electrified door hardware including, but not limited to, the following:
1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
  2. Review sequence of operation for each type of electrified door hardware.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review required testing, inspecting, and certifying procedures.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
  - B. Tag each item with Door Number related to the final Approved Door Hardware Schedule, and include basic installation instructions with each item or package.
  - C. Deliver keys to manufacturer of key control system, or Owner as Directed.

- D. Deliver keys to Owner by registered mail or overnight package service.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."
- B. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control system, security system, and building control system.

#### 1.7 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of operators and door hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period for Locksets: Three, (3) years from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Manual Closers: Ten, (10) years from date of Substantial Completion, unless otherwise indicated.
- E. Warranty Period for Exit Devices: Three, (3) years from date of Substantial Completion, unless otherwise indicated.

#### 1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

- C. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section, door hardware sets indicated in door and frame schedule, and the Door Hardware Schedule at the end of Part 3.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products. Retain subparagraph below for electrified door hardware.
  - 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
  - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

### 2.2 HINGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Butt Hinges:
    - a. Stanley Commercial Hardware
    - b. Hager Hinge Company, Inc.
    - c. Bommer Hinge Company, Inc.
  - 2. Continuous Hinges:
    - a. Hager Hinge Company, Inc. (Roton #780-224HD)
    - b. Marker Hinge Company, Inc. (#FM2011)
    - c. McKinney Hinge Company, Inc. (#MCK\_24HD)
- B. Standards: Comply with the following:
  - 1. Hinges ANSI/BHMA Standard A156.1 Grade 1
  - 2. Continuous Hinges ANSI/BHMA Standard A156.26 Grade 1
- C. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- D. Concealed bearings are made from engineered polymer material with PTFE and Aramid fiber; bearing is maintenance free, no oil, no grease.

- E. Butt hinges equipped with easily seated, non-rising pin. Hole in bottom of pin enables quick pin removal for ease of installation.
- F. Continuous hinge material to be 14 gauge, 304 stainless steel
- G. Continuous hinge steel pin to be .25 diameter, 304 stainless steel
- H. Continuous hinge exterior barrel diameter .438 (7/16)
- I. Continuous hinge knuckle to be 2", including split nylon bearing at each separation for a quiet, smooth, self-lubricating operation
- J. All hinges to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours
- K. Continuous hinges to have Symmetrically templated hole pattern
- L. Continuous hinge to have a 10 year Warranty
- M. Hinge Weight: Unless otherwise indicated, provide the following:
  - 1. Supports weights up to 600lbs.
- N. Hinge Base Metal: Unless otherwise indicated, provide the following:
  - 1. Exterior Continuous Hinges: Stainless steel, with stainless-steel pin,
  - 2. Interior Continuous Hinges: Stainless steel, with stainless-steel pin.
  - 3. Continuous Hinges for Fire-Rated Assemblies: Stainless steel, with stainless-steel pin.
  - 4. Exterior Butt Hinges: Stainless Steel or Brass or Bronze
  - 5. Interior Butt Hinges: Steel or Brass or Bronze
- O. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:
  - 1. Hospital Tips: Slope ends of hinge barrel.
  - 2. Maximum Security Pin: Fix pin in hinge barrel after it is inserted.
  - 3. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the following applications:
    - a. Outswinging exterior doors.
    - b. Outswinging corridor doors with locks.
- P. Continuous-Geared Aluminum Hinges: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (100 mm); fabricated to full height of door and frame. Finish components after milling and drilling are complete. Fabricate hinges to template screw locations.
- Q. All geared hinges to be heavy-gauge aluminum alloy with solid support blocks of self-lubricating DELRIN.
- R. All geared hinges to meet Dynamic and static load test for compliance with ANSI A156.1, (BHMA) for 350,000 cycles at 15 cycles per minute.
- S. Fasteners: Comply with the following:
  - 1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
  - 2. Wood Screws: For wood doors and frames.

3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head screws; machine screws drilled and tapped holes for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

## 2.3 LOCKS AND LATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Mechanical Locks and Latches:
    - a. Assa / Abloy Sargent 10-Line x LP Trim.
- B. Standards: Comply with the following:
  1. Bored Locks and Latches: BHMA A156.2.
- C. Bored Locks: ANSI A156.2, BHMA Series 4000, Grade 1, and is UL Listed.
- D. Certified Products: Provide door hardware listed in the following BHMA directories:
  1. Mechanical Locks and Latches: BHMA's "Directory of Certified Locks & Latches."
- E. Lock Trim: Comply with the following:
  1. Lever: Cylindrical Locks & Latches, Zinc material with a minimum wall thickness of .060
  2. Dummy Trim: Match lever lock trim and escutcheons.
- F. Lock Functions: Function numbers and descriptions indicated in the Door Hardware Schedule comply with the following:
  1. Bored Locks: BHMA A156.2.
- G. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
  1. Bored Locks: Minimum 9/16-inch latch bolt throw.
  2. Deadbolts: Minimum 1-inch bolt throw.
- H. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- I. Cylindrical Locks & Latches to have solid shank with no opening for access to keyed lever keeper.

## 2.4 DOOR BOLTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Flush Bolts:
    - a. Burns Manufacturing Company, Inc.
    - b. Triangle Brass Manufacturing Company, Inc.
- B. Standards: Comply with the following:

1. Automatic and Self-Latching Flush Bolts: BHMA A156.3.
  2. Manual Flush Bolts: BHMA A156.16.
- C. Flush Bolts: BHMA Grade 1, designed for mortising into door edge.
- D. Bolt Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:
1. Mortise Flush Bolts: Minimum 3/4-inch (19-mm) throw.

## 2.5 EXIT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Von Duprin, Inc. 98-Series
  2. Assa / Abloy Sargent 80- Series
  3. Assa / Abloy Yale 7000 - Series
- B. Standard: BHMA A156.3.
1. BHMA Grade: Grade 1
- C. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."
- D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- E. Fire Exit Devices: Complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- F. Warranty: Exit device to have published Five (5) Year Warranty.
- G. Exit device shall be "touch pad" type with a touch pad that shall extend a minimum of one half (1/2) of the door width.
- H. Exit device shall have a one-quarter (1/4) gap between the face of the door and the touch bar channel eliminating the need for shims or cutting away the glass molding.
- I. Exit device lock stile chassis shall be investment cast steel. Stamped steel units will not be accepted. All device latch bolts shall be stainless steel and shall be deadlocking type.
- J. Exit device strikes shall be adjustable type investment cast stainless steel.
- K. Exit device shall include sound reduction dampening for both depression and extension of the touch pad.
- L. Exit device end cap shall be all metal and secured with a bracket that interlocks both at the touch bar channel base and hinge side filler to prevent end cap "peel-back".
- M. All exposed surfaces of the exit device housing shall be no less than 14 gauge brass or bronze; or no less than 16 gauge stainless steel. Aluminum housing type exit devices are not acceptable.

- N. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
  - 1. Operation: Rigid
- O. Outside Trim: Lever, Lever with cylinder, Pull, Pull with cylinder, material and finish to match locksets, unless otherwise indicated.
  - 1. Match design for locksets and latchsets, unless otherwise indicated.

## 2.6 CYLINDERS AND KEYING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cylinders:
    - a. Assa / Abloy Sargent.
- B. Standards: Comply with the following:
  - 1. Cylinders: BHMA A156.5.
- C. Cylinder Grade: BHMA Grade 1, Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
  - 1. Number of Pins: Seven.
  - 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
  - 3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 4. Bored-Lock Type: Cylinders with tailpieces to suit locks.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
  - 1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's locksets.
- E. Construction Keying: Comply with the following:
  - 1. Construction Cores: Provide Brass construction cores in all locksets and cylinders that are replaceable by permanent cores.
    - a. Replace Brass construction cores with permanent cores, as indicated in keying schedule
- F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
  - 1. No Master Key System: Cylinders are operated by change keys only.
  - 2. Master Key System: Cylinders are operated by a change key and a master key.
  - 3. Grand Master Key System: Cylinders are operated by a change key, a master key, and a grand master key.
  - 4. Great-Grand Master Key System: Cylinders are operated by a change key, a master key, a grand master key, and a great-grand master key.
  - 5. Existing System: Master key or grand master key locks to Owner's existing system.
  - 6. Keyed Alike: Key all cylinders to the same change key.

- G. Keys: Provide nickel-silver keys complying with the following:
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: **"DO NOT DUPLICATE."**
  2. Quantity: In addition to one extra blank key for each lock, provide the following:
    - a. Cylinder Change Keys: Three.
    - b. Master Keys: Five.
    - c. Grand Master Keys: Five.
    - d. Great-Grand Master Keys: Five.
    - e. Control Keys: Five
    - f. Construction Master Keys: Ten
    - g. Construction Core Control Keys: Five

## 2.7 STRIKES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Electric Strikes:
    - a. Security Door Controls Inc.
    - b. Folger Adam Security Inc.
- B. Standards: Comply with the following:
1. Strikes for Bored Locks and Latches: BHMA A156.2.
  2. Strikes for Mortise Locks and Latches: BHMA A156.13.
  3. Strikes for Interconnected Locks and Latches: BHMA A156.12.
  4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
  5. Dustproof Strikes: BHMA A156.16.
  6. Electric Strikes: BHMA A156.5.
- C. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latch bolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- D. Dustproof Strikes: BHMA Grade 1
- E. Electric Strikes: BHMA Grade 1

## 2.8 OPERATING TRIM

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Burns Manufacturing Company, Inc.
  - 2. Stanley Commercial Hardware
- B. Standard: Comply with BHMA A156.6.
- C. Materials: Fabricate from aluminum, brass, bronze, stainless steel, unless otherwise indicated.

## 2.9 ACCESSORIES FOR PAIRS OF DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Coordinators:
    - a. Burns Manufacturing Company, Inc.
    - b. Triangle Brass Manufacturing Company, Inc.
  - 2. Removable Mullions:
    - a. Von-Duprin Inc.
    - b. Assa / Abloy Sargent
    - c. Assa / Abloy Yale
  - 3. Astragals:
    - a. Stanley Commercial Hardware
    - b. Architectural Builders Hardware, Inc.
- B. Standards: Comply with the following:
  - 1. Coordinators: BHMA A156.3.
  - 2. Removable Mullions: BHMA A156.3.
- C. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.

## 2.10 CLOSERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Surface-Mounted Closers:
    - a. LCN Door Controls, Inc. #4040MC Series
    - b. Assa / Abloy Sargent # 281MC Series
    - c. Assa / Abloy Norton # 7500M Series
- B. Standards: Comply with the following:
  - 1. Closers: BHMA A156.4.

- C. Surface Closers: BHMA Grade 1
- D. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."
- E. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

## 2.11 PROTECTIVE TRIM UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Metal Protective Trim Units:
    - a. Burns Manufacturing Company, Inc.
    - b. Triangle Brass Manufacturing Company, Inc.
- B. Standard: Comply with BHMA A156.6.
- C. Materials: Fabricate protection plates from the following:
  - 1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled 4 sides.
- D. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
- E. Furnish protection plates sized 2" less than door width on push side and 1" less than door width on pull side, by height specified in Door Hardware Schedule.

## 2.12 STOPS AND HOLDERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Architectural Builders Hardware Mfg., Inc.
  - 2. Triangle Brass Manufacturing Company, Inc.
- B. Standards: Comply with the following:
  - 1. Stops and Bumpers: BHMA A156.16.
  - 2. Mechanical Door Holders: BHMA A156.16.
  - 3. Electromagnetic Door Holders: BHMA A156.15.
  - 4. Combination Overhead Holders and Stops: BHMA A156.8.
  - 5. Door Silencers: BHMA A156.16.
- C. Stops and Bumpers: BHMA Grade 1
- D. Mechanical Door Holders: BHMA Grade 1
- E. Combination Overhead Stops and Holders: BHMA Grade 1
- F. Electromagnetic Door Holders for Labeled Fire Door Assemblies: Coordinate with fire detectors and interface with fire alarm system.

- G. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

## 2.13 DOOR GASKETING

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Door Gasketing:
    - a. Reese Manufacturing Co., Inc.
    - b. National Guard Products, Inc.
  - 2. Door Bottoms:
    - a. Reese Manufacturing Co., Inc.
    - b. National Guard Products
- B. Standard: Comply with BHMA A156.22.
- C. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
  - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
  - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
  - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- D. Air Leakage: Not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283.
- E. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
  - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- F. Fire-Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL 10B or NFPA 252.
- G. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.
- H. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- I. Gasketing Materials: Comply with ASTM D 2000 and AAMA 701/702.

## 2.14 THRESHOLDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Reese Manufacturing Co., Inc.
  - 2. National Guard Products, Inc.

- B. Standard: Comply with BHMA A156.21.

## 2.15 FABRICATION

- A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  - 2. Steel Machine or Wood Screws: For the following fire-rated applications:
    - a. Mortise hinges to doors.
    - b. Strike plates to frames.
    - c. Closers to doors and frames.
  - 3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
    - a. Surface hinges to doors.
    - b. Closers to doors and frames.
    - c. Surface-mounted exit devices.
  - 4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
  - 5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

## 2.16 FINISHES

- A. Standard: Comply with BHMA A156.18.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are

acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

- D. BHMA Designations: Comply with base material and finish requirements indicated by the following:
1. BHMA 600: Primed for painting, over steel base metal.
  2. BHMA 626: Satin chromium plated over nickel, over brass or bronze base metal.
  3. BHMA 628: Satin aluminum, clear anodized, over aluminum base metal.
  4. BHMA 630: Satin stainless steel, over stainless steel base metal.
  5. BHMA 652: Satin chromium plated over nickel, over steel base metal.
  6. BHMA 689: Aluminum painted, over any base metal.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.
- B. Wood Doors: Comply with DHI A115-W series.

#### 3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
  3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule. Supply key cabinet with 25% expansion. Factory install keys in cabinet or in field with owner's representative. Key cabinet to be supplied with a "Complete System" equal to the Telkee System.
- D. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings, in equipment room. Verify location with Architect.
1. Configuration: Provide one power supply for each door opening.
  2. Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.
- E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

### 3.4 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner or Architect will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

### 3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
  2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
  3. Door Closers: Adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
  2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
  3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

3.6 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.8 DOOR HARDWARE SCHEDULE

- A. Hardware Set 01 – Single Door. HM Door and HM Frame. Exterior. Card Reader  
Doors: 101, 105, 110A  
Operation: Passage from inside at all times. Passage from outside by key of when unlocked by key.

Qty	Description	Finish	Mfg
1	CONTINUOUS HINGE 780-224HD x UL x FULL HT	628	ROTON
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
1	DOOR CLOSER 4040XP x SHCUSH x SRI	626	LCN
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
1	DOOR SWEEP 772A x FULL WIDTH	628	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
1	CARD READER		
1	POWER SUPPLY 10-1-FPD x 1.5a	600	RCI
1	DOOR CONTACT BY ACCESS CONTROL SUPPLIER		

- B. Hardware Set 02 – Single Door. HM Door and HM Frame. Exterior.  
Doors: 108  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
1	CONTINUOUS HINGE 780-224HD x UL x FULL HT	628	ROTON
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
1	DOOR CLOSER 4040XP x SHCUSH	626	LCN
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
1	DOOR SWEEP 772A x FULL WIDTH	628	REESE
1	DOOR CONTACT BY ACCESS CONTROL SUPPLIER		

- C. Hardware Set 03 – Single Door. HM Door and HM Frame. Exterior. Exit Only  
Doors: 108C  
Operation: Passage from inside at all times.

Qty	Description	Finish	Mfg
1	CONTINUOUS HINGE 780-224HD x UL x FULL HT	628	ROTON
1	SVR EXIT DEVICE 9827L-F x 996L x LBR	626	VON DUPRIN
1	TEAR DROP SEAL 797B x HEAD & JAMBS	BLK	REESE
1	RAIN DRIP R201A x FULL WIDTH + 4"	628	REESE
1	THRESHOLD S483APR x SRS x FHSL x FULL WIDTH	628	REESE
1	DOOR SWEEP 772A x FULL WIDTH	628	REESE
1	DOOR CLOSER 4040XP x SHCUSH	626	LCN
1	DOOR CONTACT BY ACCESS CONTROL SUPPLIER		

- D. Hardware Set 04 – Single Door. HM Door and HM Frame. Interior.  
Doors: 101A, 105B  
Operation: Passage from inside at all times. Passage from outside at all times.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	PASSAGE LATCHSET 28-10U15 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO

- E. Hardware Set 05 – Single Door. Wood Door and HM Frame. Interior.  
Doors: 108B  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO

- F. Hardware Set 06 – Single Door. Wood Door and HM Frame. Interior.  
Doors: 106, 107  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	PRIVACY LATCHSET 28-10U65 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO

- G. Hardware Set 07 – Single Door. Wood Door and HM Frame. Interior.  
Doors: 104, 103  
Operation: Passage from inside at all times. Passage from outside by key of when unlocked by key. Push button inside locks outside trim.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	OFFICE LOCKSET 63-64-28-10G05 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO

- H. Hardware Set 08 – Single Door. Wood Door and HM Frame. Interior.  
Doors: 102, 105A  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO
1	CARD READER		
1	POWER SUPPLY 10-1-FPD x 1.5a	600	RCI

- I. Hardware Set 09 – Single Door. Hollow Metal Door and HM Frame. Interior.  
Doors: 109, 110  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
3	HINGE CB168 4.5 x 4.5	652	STANLEY
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
1	WALL STOP 1270WV	630	TRIMCO
3	SILENCERS 1229A	GRAY	TRIMCO
1	CARD READER		
1	POWER SUPPLY 10-1-FPD x 1.5a	600	RCI

- J. Hardware Set 05 – Double Door. HM Door and HM Frame. Interior.  
Doors: 108A  
Operation: Passage from inside at all times. Passage from outside by key.

Qty	Description	Finish	Mfg
6	HINGE CB168 4.5 x 4.5	652	STANLEY
1	STOREROOM LOCKSET FC-63-64-28-10G04 x LP	626	SARGENT
2	WALL STOP 1270WV	630	TRIMCO
6	SILENCERS 1229A	GRAY	TRIMCO
2	FLUSHBOLTS 3923	652	TRIMCO

END OF SECTION 08 70 00

**SECTION 22 30 00**  
**PLUMBING EQUIPMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water heaters.
- B. Expansion Tanks.
- C. Pumps.
  - 1. Circulators.
- D. Domestic Water Treatment

**1.02 RELATED REQUIREMENTS**

- A. Section 26 27 17 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.03 REFERENCE STANDARDS**

- A. ANSI Z21.10.1 - Gas Water Heaters - Volume I - Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less.
- B. ANSI Z21.10.3 - Gas-Fired Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous.
- C. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers.

**1.04 SUBMITTALS**

- A. Product Data:
  - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
  - 2. Indicate pump type, capacity, power requirements.
  - 3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
  - 4. Provide electrical characteristics and connection requirements.
- B. Shop Drawings:
  - 1. Indicate heat exchanger dimensions, size of tapings, and performance data.
  - 2. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tapings, and drains.
- C. Manufacturer's Instructions .
- D. Project Record Documents: Record actual locations of components .
- E. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.
- B. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

**1.06 CERTIFICATIONS**

- A. Water Heaters: NSF approved.

- B. Gas Water Heaters: Certified by CSA International to 1 or 2, as applicable, in addition to requirements specified elsewhere.
- C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

#### **1.08 WARRANTY**

- A. Provide five year manufacturer warranty for domestic water heaters and in-line circulator.

#### **1.09 EXTRA MATERIALS**

- A. Provide two pump seals.

### **PART 2 PRODUCTS**

#### **2.01 DIAPHRAGM-TYPE COMPRESSION TANKS**

- A. Manufacturers:
  - 1. Amtrol Inc: [www.amtrol.com/#sle](http://www.amtrol.com/#sle).
  - 2. ITT Bell & Gossett: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  - 3. Taco, Inc: [www.taco-hvac.com/#sle](http://www.taco-hvac.com/#sle).
- B. Construction: Welded steel, tested and stamped in accordance with ASME (BPV VIII, 1); supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible diaphragm sealed into tank, and steel legs or saddles.
- C. Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 55 psig.

#### **2.02 WATER TREATMENT**

- A. Vendors:
  - 1. Syntec Corporation
  - 2. Limbach Corporation, LLC
  - 3. Klenzoid, Inc.
  - 4. Substitutions: Not permitted.
- B. Warranty: Provide 5-year warranty to cover parts and labor of repair or replacement cost of valves and electronics. Provide 10-year warranty to cover parts and labor of repair or replacement cost of tanks.
- C. Backwash Mixed Media Filter
  - 1. 5600 SXT Mixed Media Filter CH30666 by Fleck or approved equal.
  - 2. Mixed media mineral tank, 2 cubic feet volume (12"x52"), with removable riser tube.
  - 3. Filter mixed media shall include sand, garnet, gravel and anthracite arranged in layers to achieve sediment filtration to 10 micron.
  - 4. 5600 SXT electronic timer with LCD display and 5600 SXT control valve.
    - a. The valve shall be pre-programmed and have a drain line flow control (DLFC) valve pre-installed.
    - b. Backwash flow shall be 5.0 to 7.0 gallons per minute.
  - 5. Provide 1" insulated domestic water drain line with isolation valve to discharge backwash water to splashblock at grade at location as directed by owner.
- D. Twin Alternating Water Softener
  - 1. 9100 Twin Alternating Water Softener by Fleck or approved equal.
  - 2. Dual softener tanks, 2 cubic feet volume (12"x52") each.
  - 3. Brine tank, 15"x34".
  - 4. Softener media shall be cationic resin.

5. Provide with 3/4" stainless steel bypass valve.
  6. 3200 SXT mechanical timer with LCD display.
  7. Provide lead-free brass meter, lead-free brass bypass valve, and auxiliary switches.
- E. Mixed Marble pH Neutralizer
1. Mixed Marble pH Neutralizer by Duff Water Conditioning or approved equal.
  2. pH Neutralizer tank shall be 2 cubic feet volume (12"x52").
  3. Provide inlet and outlet isolation valves (no backwash).
- F. Metered Chlorination Pump System
1. Econ FP Meter System by Stenner or approved equal.
  2. Maximum working pressure shall be 80psi.
  3. Provide with chlorine pump and chlorine tank, and 6-button user interface with LCD display.
- G. Installation - Water Treatment
1. Flush and backwash mixed media filter until media has stabilized and domestic water distribution system is clean of suspended solids and filter media.
  2. Fill twin alternating water softener with cationic resin and fill brine tank. Adjust mechanical timer for proper operation.
  3. Fill pH neutralizer with the correct volume of mixed marble pH neutralizer media, test pH routinely and tune final pH.
  4. Install chlorination pump system and provide filled chlorine solution tank. Provide polyethylene tubing from pump to injection points and provide all final connections. Connect low voltage wiring to flow meter for flow interlock.
  5. Provide water testing as required by the DE Office of Drinking Water (before chlorine treatment and after chlorine treatment), submit to Delaware compliance laboratory for testing and approval.
  6. Contractor to coordinate approvals with all agencies having jurisdiction for safe drinking water, and submit for permit to construct prior to beginning of work.
- H. Water Treatment Term Service Contract
1. The contractor shall include one year water treatment service from date of substantial completion with base bid. Water treatment service shall include -- at minimum -- monthly service visits, initial startup with 8 hours of training and demonstration for owner personnel, maintenance and adjustment to extent required to maintain satisfactory levels of suspended solids, pH, softness, chlorine, and biological growth, and provide standard written one-year domestic water treatment maintenance service contract.

### **2.03 IN-LINE CIRCULATOR PUMPS**

- A. Manufacturers:
1. Armstrong Pumps Inc: [www.armstrongpumps.com/#sle](http://www.armstrongpumps.com/#sle).
  2. ITT Bell & Gossett: [www.bellgossett.com/#sle](http://www.bellgossett.com/#sle).
  3. SIHI Group: [www.sterlingsihi.com/#sle](http://www.sterlingsihi.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Casing: Bronze, rated for 125 psig working pressure.
- C. Impeller: Bronze.
- D. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.
- E. Seal: Carbon rotating against a stationary ceramic seat.
- F. Drive: Flexible coupling.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related gas venting and electrical work to achieve operating system.
- C. Pumps:
  - 1. Provide air cock and drain connection on horizontal pump casings.
  - 2. Provide line sized isolating valve and strainer on suction and line sized soft seated check valve and balancing valve on discharge.
  - 3. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 4 inches and over.
  - 4. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
  - 5. Align and verify alignment of base mounted pumps prior to start-up.

**END OF SECTION**

**SECTION 26 29 13**  
**ENCLOSED CONTROLLERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Enclosed NEMA controllers for low-voltage (600 V and less) applications:
  - 1. Magnetic motor starters.
  - 2. Manual motor starters.
- B. Overcurrent protective devices for motor controllers, including overload relays.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 28 13 - Fuses: Fuses for fusible switches.

**1.03 REFERENCE STANDARDS**

- A. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
- D. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts.
- E. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
- F. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
- G. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum).
- H. NFPA 70 - National Electrical Code.
- I. UL 98 - Enclosed and Dead-Front Switches.
- J. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
- K. UL 60947-1 - Low-Voltage Switchgear and Controlgear - Part 1: General Rules.
- L. UL 60947-4-1 - Low-Voltage Switchgear and Controlgear - Part 4-1: Contactors and Motor-starters - Electromechanical Contactors and Motor-starters.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
  - 2. Coordinate the work to provide motor controllers and associated overload relays suitable for use with the actual motors to be installed.
  - 3. Coordinate the work to provide controllers and associated wiring suitable for interface with control devices to be installed.
  - 4. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 5. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
  - 6. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

## 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.
- C. Shop Drawings: Indicate dimensions, voltage, controller sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
  - 1. Include wiring diagrams showing all factory and field connections.

## PART 2 PRODUCTS

### 2.01 ENCLOSED MOTOR CONTROLLERS

- A. Provide enclosed motor controller assemblies consisting of all required components, control power transformers, instrumentation and control wiring, accessories, etc. as necessary for a complete operating system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Description: Enclosed motor controllers complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; ratings, configurations and features as indicated on the drawings.
- D. Service Conditions:
  - 1. Provide motor controllers and associated components suitable for operation under the following service conditions without derating:
    - a. Altitude:
      - 1) Class 1 Km Equipment (devices utilizing power semiconductors, e.g. variable frequency controllers): Less than 3,300 feet.
      - 2) Class 2 Km Equipment (electromagnetic and manual devices): Less than 6,600 feet.
    - b. Ambient Temperature: Between 32 degrees F and 104 degrees F.
  - 2. Provide motor controllers and associated components suitable for operation at indicated ratings under the service conditions at the installed location.
- E. Short Circuit Current Rating:
- F. Conductor Terminations: Suitable for use with the conductors to be installed.
- G. Enclosures:
  - 1. Comply with NEMA ICS 6.
  - 2. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
  - 3. Finish: Manufacturer's standard unless otherwise indicated.
- H. Instrument Transformers:
  - 1. Comply with IEEE C57.13.
  - 2. Select suitable ratio, burden, and accuracy as required for connected devices.
  - 3. Current Transformers: Connect secondaries to shorting terminal blocks.
  - 4. Potential Transformers: Include primary and secondary fuses with disconnecting means.
- I. Magnetic Motor Starters: Combination type unless otherwise indicated.
  - 1. Combination Magnetic Motor Starters: NEMA ICS 2, Class A combination motor controllers with magnetic contactor(s), externally operable disconnect and overload relay(s).
  - 2. Configuration: Full-voltage non-reversing unless otherwise indicated.
  - 3. Disconnects: Circuit breaker type.

- a. Circuit Breakers: Motor circuit protectors (magnetic-only) unless otherwise indicated or required.
  - b. Provide externally operable handle with means for locking in the OFF position. Provide safety interlock to prevent opening the cover with the disconnect in the ON position with capability of overriding interlock for testing purposes.
  - c. Provide auxiliary interlock for disconnection of external control power sources where applicable.
4. Overload Relays: Bimetallic thermal type unless otherwise indicated.
- J. Manual Motor Starters:
1. Description: NEMA ICS 2, Class A manually-operated motor controllers with overload relay(s).
  2. Configuration: Non-reversing unless otherwise indicated.
  3. Fractional-Horsepower Manual Motor Starters:
    - a. Furnish with toggle operator.
    - b. Overload Relays: Bimetallic or melting alloy thermal type.

## 2.02 OVERCURRENT PROTECTIVE DEVICES

- A. Overload Relays:
1. Provide overload relays and, where applicable, associated current elements/heaters, selected according to actual installed motor nameplate data, in accordance with manufacturer's recommendations and NFPA 70; include consideration for motor service factor and ambient temperature correction, where applicable.
  2. Inverse-Time Trip Class Rating: Class 20 unless otherwise indicated or required.
  3. Trip-free operation.
  4. Visible trip indication.
  5. Resettable.
    - a. Employ manual reset unless otherwise indicated.
    - b. Do not employ automatic reset with two-wire control.
  6. Bimetallic Thermal Overload Relays:
    - a. Interchangeable current elements/heaters.
    - b. Adjustable trip; plus/minus 10 percent of nominal, minimum.
    - c. Trip test function.
  7. Melting Alloy Thermal Overload Relays:
    - a. Interchangeable current elements/heaters.
- B. Fusible Disconnect Switches:
1. Description: Quick-make, quick-break, dead-front fusible switch units complying with NEMA KS 1, and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.
  2. Fuse Clips: As required to accept indicated fuses.
  3. Provide externally operable handle with means for locking in the OFF position. Provide means for locking switch cover in the closed position. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- C. Circuit Breakers:
1. Interrupting Capacity (not applicable to motor circuit protectors):
    - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than specified minimum requirements.
    - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
  2. Motor Circuit Protectors:

- a. Description: Instantaneous-trip circuit breakers furnished with magnetic instantaneous tripping elements for short circuit protection, but not with thermal inverse time tripping elements for overload protection; UL 489 recognized only for use as part of a listed combination motor controller with overload protection; ratings, configurations, and features as indicated on the drawings.
- b. Provide field-adjustable magnetic instantaneous trip setting.

### **2.03 CONTROL ACCESSORIES**

- A. Auxiliary Contacts:
  1. Comply with NEMA ICS 5.
  2. Provide number and type of contacts indicated or required to perform necessary functions, including holding (seal-in) circuit and interlocking, plus one normally open (NO) and one normally closed (NC) spare contact for each magnetic motor starter, minimum.
- B. Pilot Devices:
  1. Comply with NEMA ICS 5; heavy-duty type.
  2. Pushbuttons: Unless otherwise indicated, provide momentary, non-illuminated type with flush button operator; normally open or normally closed as indicated or as required.
  3. Selector Switches: Unless otherwise indicated, provide maintained, non-illuminated type with knob operator; number of switch positions as indicated or as required.
  4. Indicating Lights: Push-to-test type unless otherwise indicated.
  5. Provide LED lamp source for indicating lights and illuminated devices.
- C. Control and Timing Relays:
  1. Comply with NEMA ICS 5.
  2. Provide number and type of relays indicated or required to perform necessary functions.
- D. Control Power Transformers:
  1. Size to accommodate burden of contactor coil(s) and all connected auxiliary devices, plus \_\_\_\_\_ VA spare capacity.
  2. Include primary and secondary fuses.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
- B. Install controllers in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 05 29.
- E. Install enclosed controllers plumb and level.
- F. Provide grounding and bonding in accordance with Section 26 05 26.
- G. Install all field-installed devices, components, and accessories.
- H. Provide fuses complying with Section 26 28 13 for fusible switches as indicated.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Set field-adjustable controllers and associated components according to installed motor requirements, in accordance with manufacturer's recommendations and NFPA 70.

**END OF SECTION**

**SECTION 33 11 13**  
**POTABLE WATER SUPPLY WELLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Drilling and casing water well.
- B. Pump and controller.
- C. Water system tank
- D. pH Neutralizer
- E. Water and system testing and certification.

**1.02 RELATED REQUIREMENTS**

- A. Section 26 27 17 - Equipment Wiring.

**1.03 PRICE AND PAYMENT PROCEDURES**

- A. See Section 01 22 00 - Unit Prices, for additional unit price requirements.
- B. Water Well:
  - 1. Basis of Measurement (Change in Well Depth): By the vertical foot of actual well depth change from Base Bid and recorded in Project record Documents.
    - a. Payment for each specified item will be made at the contract unit price for that item. Payment includes full compensation for equipment, materials and labor for drilling; removal and disposal of temporary casing, cuttings, and drill fluid; preparation of borehole logs; and sample handling, containers, storage, and testing. Measure depth, logging, installation, casing, riser pipe, and well screen by linear distance. Payment is not allowed for test wells or wells abandoned due to construction practices not in accordance with this specification, faulty construction practices or for the convenience of the Contractor.
  - 2. Test Well - BASE BID DEPTH = 200 FT
    - a. Compensation for the test well will be made at the contract unit price and includes material, equipment, and labor required to drill and perform tests on the test well. Measure depth as the total linear distance between ground surface and bottom of hole. If the total depth of hole is greater than that specified on the contract for "Test Well," the additional depth will be paid for at the contract unit price for "Additional Test Well Depth." If the test well is developed into the permanent well with no increase in diameter, compensation will be as described below, and separate payment will not be made for the test well.
  - 3. Water Well - BASE BID DEPTH = 200 FT
    - a. Compensation for the water well will be made at the contract unit price and includes material, equipment, and labor required to drill, develop, perform tests, and complete the permanent well. Measure depth as the total linear distance between ground surface and bottom of hole. If the total depth of well is greater than that specified in the contract for "Water Well," the additional depth will be paid for at the contract unit price for "Additional Water Well Depth."

**1.04 REFERENCE STANDARDS**

- A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- C. AWWA A100 - Water Wells.

- D. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.
- E. NEMA MG 1 - Motors and Generators.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

#### **1.05 ADMINISTRATIVE REQUIREMENTS**

- A. Scheduling: Install well in time to have permanent water supply available for testing building water distribution piping on or before Substantial Completion.

#### **1.06 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- C. Certificate: From Authority Having Jurisdiction indicating suitability of water for human consumption.
- D. Submit executed certification of well pump after performance testing.
- E. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.
- F. Accurately record actual locations of well, depth, subsoil strata, and drilling difficulties encountered.
- G. Submit signed copy of driller's log book statements.

#### **1.07 QUALITY ASSURANCE**

- A. Drilling Firm: Company specializing in performing the work of this Section with minimum 5 years documented experience.
  - 1. Submit proof of state license to perform this work.

### **PART 2 PRODUCTS**

#### **2.01 WATER WELL**

- A. Water Well: Provide a water well complying with AWWA A100 and having the following characteristics:
  - 1. Comply with all applicable regulatory and utility requirements.
  - 2. Capacity: Capable of producing a minimum 8 gallons of water per minute.

#### **2.02 MATERIALS**

- A. Well Casing (Steel): ASTM A53/A53M, 6 inch internal diameter Schedule 40 galvanized pipe, with pitless adaptor and ventilated well cap.
- B. Grout: Portland cement type, no admixtures.

#### **2.03 PUMP**

- A. Manufacturers:
  - 1. Goulds.
  - 2. Grundfos
  - 3. Red Lion
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Type: Vertical shaft, multiple stage, close coupled, for insertion in 6 inch diameter pipe.
- C. Casing: Cast iron casting with stainless steel housing and intake screen, check valve with stainless steel stem and valve seat with rubber seal built into discharge casting.
- D. Impellers and Diffusers: Bronze.
- E. Shaft: Stainless steel with stainless steel shaft sleeve.

- F. Pump: Submersible type deep well pump, water lubricated:
- G. Pump Controller: NEMA 250 Type 1 enclosure with main disconnect interlocked with door, containing across-the-line electric motor starter with starting relay and ambient compensate quick trip overloads in each phase with manual trip button and reset button; circuit breaker, control transformer, hand-off-automatic selector switches, pilot light.
- H. Pump Lift Cable: Stainless steel, multi-stranded aircraft cable, high tensile strength; cable ends fitted with closed loop fittings; length of cable equals depth of shaft plus 20 feet.

#### **2.04 TANK**

- A. Manufacturers:
  - 1. Goulds.
  - 2. Amtrol
  - 3. A.O. Smith
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Tank: Galvanized steel, tested and stamped in accordance with ASME BPVC-VIII-1; pressurized diaphragm type for pipe mount; tapping for installation of piping and accessories:
  - 1. Tank Volume (Total): 80 gal.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that site conditions will support equipment for performing drilling operations.

#### **3.02 PREPARATION**

- A. Protect structures near the well from damage.

#### **3.03 DRILLING**

- A. Drill concentric well shaft to diameters and depths indicated.
- B. Place well casing immediately after drilling. Set firmly in place.
- C. Clean shaft bottom of loose material.
- D. Allow inspection of casing prior to placement of grout.
- E. Place grout tight to surrounding work in accordance with regulatory requirements.
- F. Maintain well opening and casing free of contaminating materials.
- G. Cut off shaft top 24 inches above grade. Do not permit metal cuttings to enter casing.
- H. Disinfect well.

#### **3.04 INSTALLATION - PUMP AND TANKS**

- A. Install pump and accessories in accordance with manufacturer's instructions.
- B. Electrical Connections: Refer to Section 26 27 17.
- C. Install diaphragm tank per manufacturer's recommendations.

#### **3.05 TOLERANCES**

- A. Maximum Variation From Plumb: 1/2 inch.

#### **3.06 FIELD QUALITY CONTROL**

- A. Notify Authority Having Jurisdiction, 3 days prior to flow rate testing.
- B. Test flow rate and certify.
- C. Provide written certification of flow rate, disinfection, and pH stabilization.

**3.07 CLEANING**

- A. Clean piping in preparation for disinfecting and testing.

**END OF SECTION**