

**SECTION 22 13 29
SANITARY SEWERAGE PUMPS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between //----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.
3. Coordinate electrical requirements with the Electrical Engineer.
4. This specification section is for sanitary sewerage pumps and associated controls. Use this section for applications that do not require a sump or basin. This may include projects with new cast-in-place sumps or replacement pumps for existing systems that have the required sump or basin. If a complete pump system including basin is required use packaged pump station specification Section 22 13 33, PACKAGED, SUBMERSIBLE SEWERAGE PUMP UNITS or Section 22 13 29.13, WET-PIT MOUNTED, VERTICAL SEWERAGE PUMPS.
5. This specification section includes both completely enclosed submersible sewerage pumps and vertical sewerage pumps (unit that has submerged pump with vertical shaft and piping with the motor positioned above the effluent basin). Coordinate selection with existing conditions and NCA preference.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section pertains to sanitary //centrifugal sewerage pumps capable of handling 50 mm (2 inch) solids // grinder type sewage pumps utilizing an integral stainless steel cutting device system. See schedule on Drawings for pumps capacity and head.
- B. A complete listing of all acronyms and abbreviations are included in Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.

1.2 RELATED WORK

- A. //Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects).//
- B. //Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects).//
- C. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

- D. Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.
- E. //Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//
- F. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
- G. Section 22 05 12, GENERAL MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT.
- H. //Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS: Requirements for commissioning, systems readiness checklist, and training.//
- I. Section 26 29 11, MOTOR CONTROLLERS.

1.3 APPLICABLE PUBLICATIONS

SPEC WRITER NOTE: Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Verify and update the publication list to that which applies to the project, unless the reference applies to all plumbing systems. Publications that apply to all plumbing systems may not be specifically referenced in the body of the specification, but, shall form a part of this specification.

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. International Code Council (ICC):
 IPC-2015.....International Plumbing Code
- C. National Electrical Manufacturers Association (NEMA):
 ICS 6-1993 (R2006).....Industrial Control and Systems: Enclosures
 250-2008.....Enclosures for Electrical Equipment (1000 Volts
 Maximum)
- D. National Fire Protection Association (NFPA):
 70-2011.....National Electrical Code (NEC)
- E. Underwriters' Laboratories, Inc. (UL):
 508-99 (R2013)..... Standard for Industrial Control Equipment

1.4 SUBMITTALS

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 22 13 29, SANITARY SEWERAGE PUMPS", with applicable paragraph identification.

- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
1. Pump:
 - a. Manufacturer and model.
 - b. Operating speed.
 - c. Capacity.
 - d. Characteristic performance curves.
 2. Motor:
 - a. Manufacturer, //frame and type//.
 - b. Speed.
 - c. Current Characteristics and W (HP).
 - d. Efficiency.
 3. Controls and Disconnect Apparatus:
 - a. Starting switch.
 - b. Automatic control and level alarm.
 - c. Alternating relay.
 - d. Circuiting of control panel.
 - e. Sensors.
 4. Removal/Disconnect System.
- D. Certified copies of all the factory and construction site test data sheets and reports.

SPEC WRITER NOTE: Coordinate O&M Manual and commissioning requirements with Section 01 00 00, GENERAL REQUIREMENTS and Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.

- E. Complete operating and maintenance manuals including wiring diagrams, technical data sheets and information for ordering replaceable parts:
1. Include complete list indicating all components of the systems.
 2. Include complete diagrams of the internal wiring for each item of equipment.
 3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
- F. //Completed System Readiness Checklist provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician

and dated on the date of completion, in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.//

- G. //Submit training plans and instructor qualifications in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.//

1.5 QUALITY ASSURANCE

- A. Bio-Based Materials: For products designated by the USDA's Bio-Preferred Program, provide products that meet or exceed USDA recommendations for bio-based content, so long as products meet all performance requirements in this specifications section. For more information regarding the product categories covered by the Bio-Preferred Program, visit <http://www.biopreferred.gov>.
- B. Guaranty: Warranty of Construction, FAR clause 52.246-21.

1.6 AS-BUILT DOCUMENTATION

- A. Submit manufacturer's literature and data updated to include submittal review comments, construction revisions and any equipment substitutions.
- B. Submit operation and maintenance data updated to include submittal review comments, substitutions and construction revisions shall be inserted into a three ring binder. All aspects of system operation and maintenance procedures, including piping isometrics, wiring diagrams of all circuits, a written description of system design, control logic, and sequence of operation shall be included in the operation and maintenance manual. The operations and maintenance manual shall include troubleshooting techniques and procedures for emergency situations. Notes on all special systems or devices such as damper and door closure interlocks shall be included. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.
- C. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them on Auto-Cad version //____// provided on compact disk or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof,

it shall not be deemed a conflict of interest or breach of the 'third party testing company' requirement.

- D. Certification documentation shall be provided prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and a certification that all results of tests were within limits specified.
- E. Guaranty: Warranty of Construction, FAR clause 52.246-21.

PART 2 - PRODUCTS

SPEC WRITER NOTE: Coordinate and assure that the electrical characteristics specified below are clearly shown on the appropriate drawings. Coordinate with Electrical Engineer.

2.1 SANITARY SEWERAGE PUMP

- A. Duplex or multiplex pumps // centrifugal // grinder // type designed for 50 degrees C (140 degrees F) maximum water service. Driver shall be electric motor. Support shall be rigid type. Systems to include // two // // or more // pumps as required by the Contract Documents. Where hazardous environment condition exists, explosion proof pumps shall be installed.
 - 1. Pump housings shall be // cast iron, // // bronze, // // or stainless steel //. Cast iron housings for submersible pumps shall be epoxy coated.
- B. Impeller: // Brass // // Bronze // // Cast iron //, non-clog, to accommodate 50 mm (2 inch) solids // 316 SS impeller, 440 SS cutter and cutter plates //.
- C. Shaft: Stainless steel.
- D. Bearings: As per manufacturer's recommendations to hold shaft alignment, anti-friction type for thrust and permanently lubricated.

SPEC WRITER NOTE: Use NEMA Type 4 for drip proof (vertical) or NEMA Type 6P for completely enclosed (submersible).

- E. Motor: Maximum 40 degrees C (104 degrees F) ambient temperature rise, drip-proof, voltage and phase as shown in schedule on Electrical drawings conforming to NEMA 250, Type // 4// // 6P //. Size the motor capacity to operate pump without overloading the motor at any point on

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the pump curve. Refer to Section 22 05 12, GENERAL MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT.

- F. Starting Switch: Manually operated, tumbler type, as specified in Section 26 29 11, MOTOR CONTROLLERS.
- G. Automatic Control and Level Alarm: Provide control panel in a // NEMA 1 enclosure for indoors // // NEMA 4X enclosure for outdoors // // NEMA 7 enclosure for hazardous environment areas //.
 - 1. The controls shall be suitable for operation with the electrical characteristics listed on the electrical drawings.
 - 2. The control panel shall have a level control system with switches to start and stop pumps automatically, and to activate a high water alarm.
 - 3. The level control system will include sensors in the sump that detect the level of the liquid.
 - 4. The sensors shall be // float type switches, // // ultrasonic level sensors, // // transducers, // // or other appropriate equipment //.

SPEC WRITER NOTE: Specify other appropriate equipment as required.
 - 5. The high water alarm shall have a red beacon light at the control panel //BAS// and a // buzzer, // // horn, // // or bell //.
 - 6. The alarm shall have a silencing switch.
- H. For a duplex system, provide an alternating relay to automatically alternate leadoff and standby duties of each pump of a duplex unit at the end of each pumping cycle. Standby pump shall start when water level in sump rises to a predetermined level that indicates excessive inflow or failure of the lead pump.
- I. The circuitry of the control panel shall include:
 - 1. Power switch to turn on/off the automatic control mechanism.
 - 2. HOA switches to manually override automatic control mechanism.
 - 3. Run lights to indicate when pumps are powered up.
 - 4. Level status lights to indicate when water in sump has reached the predetermined on/off and alarm levels.
 - 5. Magnetic motor contactors.
 - 6. Disconnect/breaker for each pump.
 - 7. Automatic motor overload protection.

8. Provide auxiliary contacts for remote alarming to the Engineering Control Center and BACnet compatible open-protocol type interface to DDC Controls System.
- J. Sensors that detect the level of water in the sump shall be arranged as to allow the accumulation of enough volume of liquid so that the pump will run for a minimum cycle time of one minute. Sensors shall be located to activate the alarm before the water level rises to the inlet pipe.
- K. Provide two separate power supplies to the control panel, one for the control/alarm circuitry and one for power to the pump motors. Each power supply is to be fed from its own breaker. If a pump overload trips a breaker, the alarm system must still function. Each power supply will be wired in its own conduit. Wiring from the sump to the control panel shall have separate conduits for the pump power and for the sensor switches. All conduits are to be sealed at the sump basin and at the control panel to prevent the intrusion of moisture and of flammable and/or corrosive gases.
- L. Provide a union, and check and shut-off valve in the discharge from each pump. Locate outside the sump basin.
- M. Removal/Disconnect System: If the system utilizes a submersible pump that has a sump depth of 1.5 m (5 feet) or less, a removal/disconnect system shall be provided. The removal/disconnect system will consist of a fitting mounted on vertical guide rails attached to the sump. The pump shall be fitted with an adapter fitting that easily connects/disconnects from the discharge fitting. The discharge piping will connect to the discharge fitting to allow for removal of the pump without any other additional piping to be disconnected.
- SPEC WRITER NOTE: Delete this paragraph if the sump basin depth is less than 1.5 m (5 feet) deep.
- N. Where the sump depth is greater than 1.5 m (5 feet) or removal of the pump is difficult or hazardous, the system shall include a rail guided quick disconnect apparatus to allow the pump to be pulled up out of the sump without workers entering the sump and without disconnecting the piping. Removal/disconnect system to be compatible with and furnished by the pump manufacturer.

PART 3 - EXECUTION

PART 1 -

PART 2 -

PART 3 -

3.1 INSTALLATION

- A. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no additional cost or time to the Government.

3.2 STARTUP AND TESTING

- A. As recommended by product manufacturer and listed standards and under actual or simulated operating conditions, tests shall be conducted to prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with each integrated system.
- B. The tests shall include system capacity, control function, and alarm functions.
- C. When any defects are detected, correct defects and repeat test at no additional costs or time to the Government.
- D. //The Commissioning Agent will observe startup and Contractor testing of selected equipment. Coordinate the startup and Contractor testing schedules with the Contracting Officer's Representative and Commissioning Agent. Provide a minimum of 7 days prior to notice.//

3.3 //COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.
- B. Components provided under this section of the specification will be tested as part of a larger system.//

3.4 DEMONSTRATION AND TRAINING

- A. Provide services of manufacturer's technical representative for //four// // // hours to instruct VA Personnel in operation and maintenance of the system.
- B. //Submit training plans and instructor qualifications in accordance with the requirements of Section 22 08 00, COMMISSIONING OF PLUMBING SYSTEMS.//

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