

SECTION 213113 - ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Split-case fire pumps.
 - 2. Fire-pump accessories and specialties.

1.3 PERFORMANCE REQUIREMENTS

- A. Pump Equipment, Accessory, and Specialty Pressure Rating: 175 psig (1200 kPa) minimum unless higher pressure rating is indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, performance curves, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For fire pumps, motor drivers, and fire-pump accessories and specialties. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Product Certificates: For each fire pump, from manufacturer.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Operation and Maintenance Data: For fire pumps to include in operation and maintenance manuals.

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1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 20, "Installation of Stationary Pumps for Fire Protection."
- C. FM Global Compliance: Comply with FM Global Tech Data Sheet 3-7 "Fire Protection Pumps."

1.6 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.
- B. Coordinate size and location of fire pump controller with the Owner's electrical department for electrical power wiring by Owner.
- C. Coordinate the pressure switch settings for the new electric drive fire pump with the existing diesel drive fire pump to assure that the electric drive fire pump is the primary fire pump.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR CENTRIFUGAL FIRE PUMPS

- A. Description: Factory-assembled and -tested fire-pump and driver unit.
- B. Base: Fabricated and attached to fire-pump and driver unit with reinforcement to resist movement of pump during seismic events when base is anchored to building substrate.
- C. Finish: Red paint applied to factory-assembled and -tested unit before shipping.

2.2 HORIZONTALLY MOUNTED, SINGLE-STAGE, SPLIT-CASE FIRE PUMPS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. A-C Fire Pump Systems; a business of ITT Industries.
 - 2. Patterson Pump Company; a subsidiary of the Gorman-Rupp Company.
 - 3. PACO Pumps; Grundfos Pumps Corporation, U.S.A.
 - 4. Peerless Pump, Inc.
 - 5. Pentair Pump Group; Aurora Pump.
 - 6. S.A. Armstrong Limited.
- B. Pump:
 - 1. Standard: UL 448, for split-case pumps for fire service.
 - 2. Casing: Axially split case, cast iron with ASME B16.1 pipe-flange connections.

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3. Impeller: Cast bronze, statically and dynamically balanced, and keyed to shaft.
 4. Wear Rings: Replaceable bronze.
 5. Shaft and Sleeve: Steel shaft with bronze sleeve.
 - a. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
 - b. Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.
 6. Mounting: Pump and driver shafts are horizontal, with pump and driver on same base.
- C. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.
- D. Driver:
1. Standard: UL 1004A.
 2. Type: Electric motor; NEMA MG 1, polyphase Design B.
- E. Capacities and Characteristics:
1. Rated Capacity: 2500 gpm (9464 L/minute).
 2. Total Rated Head: 100 psig (689 kPa).
 3. Inlet Flange: Class 125.
 4. Outlet Flange: Class 250.
 5. Suction Head Available at Pump: 173 feet (53 m).
 6. Motor Horsepower: 200 minimum.
 7. Motor Speed: 1780 rpm.
 8. Electrical Characteristics:
 - a. Volts: 460.
 - b. Phase: Three.
 - c. Hertz: 60.
 9. Pump-Start, Pressure-Switch Setting: 150 psig (1034 kPa).
 10. Pump-Stop, Pressure-Switch Setting: manual.

2.3 FIRE-PUMP ACCESSORIES AND SPECIALTIES

- A. Automatic Air-Release Valves: Comply with NFPA 20 and FM Global 3-7 for installation in fire-pump casing.
- B. Circulation Relief Valves: UL 1478, brass, spring loaded; for installation in pump discharge piping.
- C. Inlet Fitting: Eccentric tapered reducer at pump suction inlet.
- D. Outlet Fitting: Concentric tapered reducer at pump discharge outlet.
- E. Hose Valve Manifold Assembly (Existing).

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2.4 GROUT

- A. Standard: ASTM C 1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink and recommended for interior and exterior applications.
- C. Design Mix: 5000-psi (34-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect fire pumps according to UL 448 requirements for "Operation Test" and "Manufacturing and Production Tests."
 - 1. Verification of Performance: Rate fire pumps according to UL 448.
- B. Fire pumps will be considered defective if they do not pass tests and inspections.
- C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine equipment bases and anchorage provisions, with Installer present, for compliance with requirements and for conditions affecting performance of fire pumps.
- B. Examine roughing-in for fire-suppression piping systems to verify actual locations of piping connections before fire-pump installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Fire-Pump Installation Standard: Comply with NFPA 20 and FM Global 3-7 for installation of fire pumps, relief valves, and related components.
- B. Equipment Mounting: Install fire pumps on concrete bases. Comply with requirements for concrete bases specified in Division 03 Section "Cast-in-Place Concrete."
 - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.
 - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.

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3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 4. Install anchor bolts to elevations required for proper attachment to supported equipment.
- C. Install fire-pump suction and discharge piping equal to or larger than sizes required by NFPA 20 and FM Global 3-7.
 - D. Support piping and pumps separately so weight of piping does not rest on pumps.
 - E. Install valves that are same size as connecting piping. Comply with requirements for fire-protection valves specified in NFPA 20 and FM Global 3-7.
 - F. Install pressure gages on fire-pump suction and discharge flange pressure-gage tappings. Comply with requirements for pressure gages specified in NFPA 20 and FM Global 3-7.
 - G. Install piping hangers and supports, anchors, valves, gages, and equipment supports according to NFPA 20 and FM Global 3-7.
 - H. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.
 - I. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

3.3 ALIGNMENT

- A. Align split-case pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.
- B. After alignment is correct, tighten anchor bolts evenly. Fill baseplate completely with grout, with metal blocks and shims or wedges in place. Tighten anchor bolts after grout has hardened. Check alignment and make required corrections.
- C. Align piping connections.
- D. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.

3.4 CONNECTIONS

- A. Comply with requirements for piping and valves specified in NFPA 20. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to pumps and equipment to allow service and maintenance.
- C. Connect fire pumps to their controllers.

3.5 IDENTIFICATION

- A. Identify system components. Comply with requirements for fire-pump marking according to NFPA 20.

3.6 FIELD QUALITY CONTROL

- A. Test each fire pump with its controller as a unit. Comply with requirements for electric-motor-driver fire-pump controllers specified in NFPA 20 and FM Global 3-7.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 - 1. After installing components, assemblies, and equipment including controller, test for compliance with requirements.
 - 2. Test according to NFPA 20 and FM Global 3-7 for acceptance and performance testing.
 - 3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - 4. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Components, assemblies, and equipment will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Furnish fire hoses in number, size, and length required to reach storm drain or other acceptable location to dispose of fire-pump test water. Hoses are for tests only and do not convey to Owner.

3.7 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks according to manufacturer's written instructions.

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3.8 DEMONSTRATION

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

END OF SECTION 213113