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SECTION 213113 - ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Fire-pump accessories and specialties.

Grout.

* + - 1. ACTION SUBMITTALS
         1. Product Data: For each type of product. Include rated capacities, operating characteristics, performance curves, electrical characteristics, and furnished specialties and accessories.
         2. Shop Drawings: For fire pumps, motor drivers, and fire-pump accessories and specialties.

Include plans, elevations, sections, and mounting and attachment details.

Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Include diagrams for power, signal, and control wiring.

* + - 1. INFORMATIONAL SUBMITTALS

Retain "Seismic Qualification Certificates" Paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Certificates: For fire pumps, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

Retain "Product Certificates" Paragraph below to require submittal of product certificates from manufacturers.

* + - * 1. Product Certificates: For each type of fire pump, from manufacturer.
        2. Source quality-control reports.
        3. Field quality-control reports.
      1. CLOSEOUT SUBMITTALS
         1. Operation and Maintenance Data: For fire pumps to include in operation and maintenance manuals.

1. PRODUCTS
   * + 1. PERFORMANCE REQUIREMENTS
          1. NFPA Compliance: Comply with NFPA 20.

Retain "Seismic Performance" Paragraph below with "Seismic Qualification Certificates" Paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete paragraph if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.

* + - * 1. Seismic Performance: Fire pumps shall withstand the effects of earthquake motions determined according to [**ASCE/SEI 7**] <**Insert requirement**>.

Retain first subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Option is used for essential facilities where equipment must operate immediately after an earthquake.

The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified[ **and the unit will be fully operational after the seismic event**]."

Component Importance Factor: 1.5.

* + - * 1. Pump Equipment, Accessory, and Specialty Pressure Rating: 175 psig minimum unless higher pressure rating is indicated.
        2. 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.
      1. GENERAL REQUIREMENTS FOR CENTRIFUGAL FIRE PUMPS
         1. Description: Factory-assembled and -tested fire-pump and driver unit.

Retain "Base" Paragraph below for projects in seismic areas.

* + - * 1. 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.
        2. Finish: Red paint applied to factory-assembled and -tested unit before shipping.
      1. FIRE-PUMP ACCESSORIES AND SPECIALTIES

Pipe sizes for pump test header, relief valves, discharge cones, and number and size of manifold hose valves are set by NFPA 20, so are not required in this article.

* + - * 1. Automatic Air-Release Valves: Comply with NFPA 20 for installation in fire-pump casing.
        2. Circulation Relief Valves: UL 1478, brass, spring loaded; for installation in pump discharge piping.
        3. Relief Valves:

Retain "Basis-of-Design Product" Subparagraph and list of manufacturers below to identify a specific product or a comparable product from manufacturers listed.

Basis-of-Design Product: Subject to compliance with requirements, provide **Zurn Industries, LLC; Model ZW205FP** or comparable product by one of the following:

<**Insert manufacturer's name**>

Description: UL 1478, bronze or cast iron, spring loaded; for installation in fire-suppression water-supply piping.

* + - * 1. Inlet Fitting: Eccentric tapered reducer at pump suction inlet.
        2. Outlet Fitting: Concentric tapered reducer at pump discharge outlet.
        3. Discharge Cone: [**Closed**] [**Open**] [**Closed or open**] type.

Retain "Hose Valve Manifold Assembly" Paragraph below even if retaining "Flowmeter Systems" Article.

* + - * 1. Hose Valve Manifold Assembly:

Standard: Comply with requirements in NFPA 20.

Header Pipe: ASTM A53/A53M, Schedule 40, galvanized steel, with ends threaded according to ASME B1.20.1.

Header Pipe Fittings: ASME B16.4, galvanized cast-iron threaded fittings.

Automatic Drain Valve: UL 1726.

Retain "Manifold, Flush-Type Body" or "Manifold, Exposed-Type Body" Subparagraph below.

Manifold, Flush-Type Body:

Test Connections: Comply with UL 405; however, provide outlets without clappers instead of inlets.

Body: Flush type, brass or ductile iron, with number of outlets required by NFPA 20.

Nipples: ASTM A53/A53M, Schedule 40, galvanized-steel pipe, with ends threaded according to ASME B1.20.1.

Adapters and Caps with Chain: Brass or bronze, with outlet threaded according to NFPA 1963 and matching local fire-department threads.

Escutcheon Plate: Brass or bronze; rectangular.

Hose valves in first "Hose Valves" Subparagraph below are typically unnecessary; retain if required.

Hose Valves: UL 668, bronze, with outlet threaded according to NFPA 1963 and matching local fire-department threads.

Exposed Parts Finish: [**Polished**] [**Rough**] [**brass**] [**, chrome plated**].

Escutcheon Plate Marking: Equivalent to "FIRE PUMP TEST."

Manifold, Exposed-Type Body:

Test Connections: Comply with UL 405; however, provide outlets without clappers instead of inlets.

Body: Exposed type, brass, with number of outlets required by NFPA 20.

Escutcheon Plate: Brass or bronze; round.

Hose valves in "Hose Valves" Subparagraph below are typically unnecessary; retain if required.

Hose Valves: UL 668, bronze, with outlet threaded according to NFPA 1963 and matching local fire-department threads. Include caps and chains.

Exposed Parts Finish: [**Polished**] [**Rough**] [**brass**] [**, chrome plated**].

Escutcheon Plate Marking: Equivalent to "FIRE PUMP TEST."

* + - 1. GROUT
         1. Standard: ASTM C1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
         2. Characteristics: Nonshrink and recommended for interior and exterior applications.
         3. Design Mix: 5000-psi, 28-day compressive strength.
         4. Packaging: Premixed and factory packaged.
      2. SOURCE QUALITY CONTROL
         1. Testing: Test and inspect fire pumps according to UL 448 requirements for "Operation Test" and "Manufacturing and Production Tests."

Verification of Performance: Rate fire pumps according to UL 448.

See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Fire pumps will be considered defective if they do not pass tests and inspections.
        2. Prepare test and inspection reports.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine equipment bases and anchorage provisions, with Installer present, for compliance with requirements for installation tolerances, and other conditions affecting performance of fire pumps.
          2. Examine roughing-in for fire-suppression piping systems to verify actual locations of piping connections before fire-pump installation.
          3. Proceed with installation only after unsatisfactory conditions have been corrected.
       2. INSTALLATION
          1. Fire-Pump Installation Standard: Comply with NFPA 20 for installation of fire pumps, relief valves, and related components.
          2. Equipment Mounting:

Retain first subparagraph below to require equipment to be installed on cast-in-place concrete equipment bases.

Install fire pumps on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."

Retain one of two subparagraphs below. Retain first for projects in seismic areas; retain second for projects not in seismic areas. Indicate vibration isolation and seismic-control device type and minimum deflection in supported equipment schedule on Drawings.

Comply with requirements for vibration isolation and seismic-control devices specified in Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

Comply with requirements for vibration isolation devices specified in Section 210548.13 "Vibration Controls for Fire-Suppression Piping and Equipment."

* + - * 1. Install fire-pump suction and discharge piping equal to or larger than sizes required by NFPA 20.
        2. Support piping and pumps separately, so weight of piping does not rest on pumps.
        3. Install valves that are same size as connecting piping. Comply with requirements for fire-protection valves specified in Section 211000 "Water-Based Fire-Suppression Systems."
        4. Install pressure gages on fire-pump suction and discharge flange pressure-gage tappings. Comply with requirements for pressure gages specified in Section 211000 "Water-Based Fire-Suppression Systems."
        5. Install piping hangers and supports, anchors, valves, gages, and equipment supports according to NFPA 20.

Retain first paragraph below if specifying flowmeter systems.

* + - * 1. Install flowmeters and sensors. Install flowmeter-system components and make connections according to NFPA 20 and manufacturer's written instructions.
        2. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not factory mounted. Furnish copies of manufacturers' wiring diagram submittals to electrical Installer.
        3. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
      1. ALIGNMENT
         1. Align [**end-suction**] [**and**] [**split-case**] pump and driver shafts after complete unit has been leveled on concrete base, grout has set, and anchor bolts have been tightened.
         2. 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.
         3. Align piping connections.
         4. Align pump and driver shafts for angular and parallel alignment according to HI 1.4 and to tolerances specified by manufacturer.
      2. CONNECTIONS

Coordinate fire-suppression piping installations and specialty arrangements with schematics on Drawings and with requirements specified in piping systems. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Comply with requirements for piping and valves specified in Section 211000 "Water-Based Fire-Suppression Systems." Drawings indicate general arrangement of piping, fittings, and specialties.
        2. Install piping adjacent to pumps and equipment to allow service and maintenance.
        3. Connect relief-valve discharge to drainage piping or point of discharge.
        4. Connect flowmeter-system meters, sensors, and valves to tubing.
        5. Connect fire pumps to their controllers.
      1. IDENTIFICATION
         1. Identify system components. Comply with requirements for fire-pump marking according to NFPA 20.
      2. FIELD QUALITY CONTROL
         1. Test each fire pump with its controller as a unit. Comply with requirements for electric-motor-driver fire-pump controllers specified in Section 262933 "Controllers for Fire-Pump Drivers."

Retain "Manufacturer's Field Service" Paragraph below to require a factory-authorized service representative to perform inspections, tests, and adjustments.

* + - * 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

Retain "Perform the following tests and inspections" Paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections[ **with the assistance of a factory-authorized service representative**].

After installing components, assemblies, and equipment, including controller, test for compliance with requirements.

Test according to NFPA 20 for acceptance and performance testing.

Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

See Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

* + - * 1. Components, assemblies, and equipment will be considered defective if they do not pass tests and inspections.
        2. Prepare test and inspection reports.

Arrange for disposal of large amounts of water if fire-pump test water must be wasted.

* + - * 1. 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.
      1. STARTUP SERVICE
         1. [**Engage a factory-authorized service representative to perform**] [**Perform**] startup service.

Complete installation and startup checks according to manufacturer's written instructions.

<**Insert startup steps if any**>.

* + - 1. DEMONSTRATION
         1. [**Engage a factory-authorized service representative to train**] [**Train**] Owner's maintenance personnel to adjust, operate, and maintain fire pumps.

END OF SECTION 213113