1DIVISION 15- MECHANICAL
Section 15320 Fire Pumps

1.00 PART 1 -GENERAL

1.01 DESCRIPTION OF WORK:

A. Provide pumps for fire suppression.

1.02 SECTION INCLUDES:

A. Single Stage, Double Suction, 9100 Series Horizontal Splitcase Fire Pump (Base Mounted)

RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.
- Section *** - Submittals
- Section *** - Pipe and Fittings
- Section *** - Mechanical General Requirements
- Section *** - Electric Motors
- Section *** - Electrical General Requirements
- Section *** - Fire Pump Controllers
- Section *** - Jockey Pumps
- Section *** - Controller – Jockey Pump

1.03 QUALITY ASSURANCE:

A. All equipment or components of this specification section shall meet or exceed the requirements and quality of the items herein specified, or as denoted on the drawings.
B. The fire pump shall be assembled by the pump manufacturer. An assembler of fire pumps not engaged in the design and construction of fire pumps shall not be considered as a fire pump manufacturer. The manufacturer shall assume “Unit Responsibility” for the complete fire pump. Unit responsibility shall be defined as responsibility for interface and successful operation of all system components supplied by the pumping system manufacturer.
C. Ensure pump pressure ratings are at least equal to system’s maximum operating pressure at point where installed, but not less than specified.
D. The manufacturer shall have a minimum of 20 years experience in the design and construction of fire pump systems.
E. The manufacturer shall carry a minimum product liability insurance of $2,000,000 per occurrence, with an aggregate product liability of $6,000,000.
F. Equipment provider shall be responsible for providing certified equipment start-up and, when noted, an in the field certified training session. This pump start-up shall be by the pump manufacturer or a certified factory-trained representative per NFPA 20,

Section 11-2. This start-up shall include verification of proper installation, system initiation, adjustment and fine tuning. Start-up shall not be considered complete until the sequence of operation, including all alarms, has been sufficiently demonstrated to the owner or owner's designated representative. This job site visit shall occur only after all hook-ups, tie-ins, and terminations have been completed and signed off on the manufacturer's start-up request form.

1.04 PRODUCT HANDLING:

A. Protection: Use all means necessary to protect equipment before, during, and after installation in accordance with manufacturer's storage, installation and maintenance instructions.

1.05 REGULATORY REQUIREMENTS:

A. National Fire Protection Association (NFPA 20)
B. Factory Mutual (FM)
C. Institute of Electrical and Electronic Engineers (IEEE)
D. National Electrical Manufacturers Association (NEMA)
E. American Society for Testing and Materials (ASTM)
F. National Electric Code (NEC)
G. Occupational Safety and Health Administration (OSHA)
H. ANSI/HI standards
I. Underwriters Laboratories, Inc.

1.06 SUBMITTAL:

A. Submit each item in this article according to the Conditions of the Contract and Specifications Sections.
B. Submit manufacturer's installation instructions under provisions of General Conditions.
C. Product Data including certified performance curves and rated capacities of selected models, weights (shipping, installed, and operating), furnished specialties, and accessories. Indicate pump's operating point on curves.
D. Hanging and support requirements should follow the recommendations in the manufacturer's installation instructions.

1.07 OPERATION AND MAINTENANCE DATA:

A. All equipment or components of this specification section shall meet or exceed the requirements and quality of the items herein specified, or as denoted on the drawings.

1.08 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to the site in such a manner as to protect the materials from shipping and handling damage. Provide materials on factory provided shipping skids.

Materials damaged by the elements should be packaged in such a manner that they could withstand short-term exposure to the elements during transportation.

B. Store materials in clean, dry place and protect from weather and construction traffic. Handle carefully to avoid damage.

1.09 WARRANTY:

A. Provide a minimum one (1) year warranty from the date of operation or eighteen (18) months from the date of shipment on the product, whichever comes first.

2.00 PART 2- PRODUCTS

A. The specifying engineer reserves the right to specify a primary supplier/lead spec manufacturer on all supplied schedule and specification documents. These primary suppliers have lead their respective industry in research and development and their products have had proven track records in the field. These primary suppliers, in the opinion of this engineering firm, produce a superior product to the alternately listed manufacturers. The contractor may choose to supply equivalent equipment as manufactured by the alternately specified manufacturer. This alternately specified equipment will be supplied on a deduct alternate basis and based on the approval of the supplied alternate manufacturer's submittals.

   The use of a primary supplier and deduct alternates protects the specifying engineer's design concept, but allows for a check-and-balance system to protect the post-commissioning owner.

2.01 Single Stage, Double Suction, Horizontal Splitcase 9100 Series Fire Pumps (Base Mounted)

A. Manufacturer

   Contractor shall furnish and install an A-C Fire Pump System or approved equal UL Listed and/or FM Approved double suction horizontal splitcase pump Model 9100 for fire suppression. The pump(s) shall conform to the standards of NFPA 20 latest edition for the installation of centrifugal fire pumps.

B. Double Suction Horizontal Splitcase Pump

   1. The pump will provide a rated capacity of _____ GPM and a differential pressure of _____ PSI. At 150% of rated capacity, the pump shall develop at least 65% of its rated head and shall not exceed 140% of the rated head at zero capacity. The pump shall be tested at the factory and a test curve shall be submitted showing the performance and horsepower requirements based on this test before final acceptance.

2. The **pump** shall be a single stage, double suction, horizontally split case design, in cast iron bronze fitted construction with packing bearing directly on a bronze shaft sleeve. The casing shall be (close-grained cast iron ASTM A48 Class 35A for working pressures up to 175 psig), (ductile iron for working pressures up to 400 psig), and shall be of axially-split design with suction and discharge flanges and mounting feet cast integral with the lower half casing. Tapped and plugged holes shall be provided for priming, vent drain and gauge connections. The pump internals shall be capable of being serviced by removing the upper half casing without disturbing the piping connections or packing area. Flanges shall be 125# or 250# per ANSI B16.1 Standard. Suction and discharge shall be on a common centerline in both horizontal and vertical planes.

3. The **impeller** shall be of the enclosed double suction type made of bronze ASTM B584-875 non-overloading in operating characteristics utilizing the motor service factor, statically or dynamically balanced. The impeller shall be keyed to the shaft and positioned axially by the shaft sleeves, which are, in turn, locked in place by shaft nuts.

4. The **shaft** shall be made of SAE-1045 Steel or better, and of ample size to operate under load with a minimum of deflection. Shaft shall not be threaded anywhere inside the pump casing.

5. The **shaft sleeve** shall be made of bronze ASTM B584-932 and shall be locked in place by threaded, bronze shaft sleeve nuts. An “O”-ring shall be furnished under the sleeve to prevent leakage.

6. **Stuffing box housing/Bearing brackets** shall be made of cast iron ASTM A48 Class 25A or Class 30A separate from the casing. Stuffing boxes shall not be split, but machined of one concentric piece to ease sealing. Stuffing box/bearing brackets will be drilled and tapped for drain connection. The stuffing box shall consist of graphited acrylic yarn packing, and a split type gland to permit removal and access to packing. Ample space shall be provided for re-packing the stuffing box.

7. Piping, valve and seal cages (if necessary) can be supplied to provide packing lubrication and shall be mounted on the upper half of the casing. Flush from an external source shall also be possible for lubrication and/or cooling.

8. **Casing rings** shall be made of bronze ASTM B584-932 and shall be installed with an anti-rotation device and designed to restrict leakage across the ring fit.

9. **Bearings** shall be grease lubricated ball type, single row inboard, double row outboard, selected to carry radial and thrust loads. The outboard bearing shall be retained by a bearing locknut and lockwasher. (Snap rings are not acceptable). The bearings, (inboard and outboard) shall be replaceable without opening the pump casing.

10. **Bearing housings** are made of cast iron ASTM A48 Class 25A or Class 30A, bolted to the ends of the bearing bracket/stuffing box and shall be male-female fitted for a full 360 degrees to assure positive alignment. The housings shall provide a fit for the inboard bearing that allows freedom for thermal expansion while the outboard bearing shall be clamped in place to take all thrust loads and keep the rotating element in its proper axial location. Openings for adding new grease and draining old grease shall be provided.

11. **Baseplate** shall be steel with or without drip pan, sufficiently rigid to support the pump and the driver. Final alignment of pump and driver shall be made after grouting and installation, and shall be approved by customer prior to operation.

12. **Coupling** shall be of the manufacturer's choice and of the flexible type. Coupling hubs shall be secured to the driver and driven shafts by a set screw located over the key.

13. **Coupling guard** shall be the can type, all metal guard rated per ANSI B15-1, Section 8 and OSHA 1910-219 compliant.

14. The driver shall be mounted with the pump on a baseplate at the pump manufacturer's plant and shipped as one unit.

15. Pump rotation shall be clockwise or counterclockwise when viewed from the driver.

16. Nameplates and other data plates shall be all corrosion resistant and suitably secured to the pump.

17. Pump manufacturer shall be ISO9001 certified.

2.02 Accessories

A. The 9100 Series Horizontal Splitcase Fire Pump shall be furnished with the following fittings as standard:

   1) ¾" casing relief valve (250 GPM through 2500 GPM) or 1" casing relief valve (3000 GPM and larger)
   2) ¾" automatic air release valve
   3) 3 ½" dial suction and discharge gauges

B. Other fittings and accessories may include the following based on the specification:

   1) eccentric suction reducer (if required)

2) concentric discharge increaser (if required)
3) hose valve test header
   (___) hose valve with 2 ½" NST
   (___) caps and chains for the above hose valves
4) main relief valve
5) closed waste cone
6) flowmeter
7) suction control valve