HORIZONTAL END SUCTION CENTRIFUGAL PUMPS

- Per AWWA E103-15, the pumps shall have a continuously rising characteristic curve from rated points to shut-off. Drive and pump shall be designed for continuous or intermittent service. Pumps shall be capable of operating at any point on the head-capacity curve without exceeding the motor nameplate rating.

- SUBMITTALS:
  - Shop Drawings – for approval, 2 weeks after award of PO
  - Standard installation drawings and instructions – 4 weeks after award of PO
  - Certified Factory Test Results – for approval, prior to shipment
  - Operation and Maintenance Manuals – prior to or with shipment
  - Certificate of Conformance – prior to or with shipment

- FACTORY TESTING:
  - The pump manufacturer shall conduct full scale, full range factory performance tests on the pump/motor skid with respect to capacity, head, NPSH, horsepower, and vibration. Certified test reports, that cover the following shall be submitted, both a hard and a digital copy, for approval:
    - Capacity vs. head curve in U.S. gallons per minute and feet.
    - Efficiency vs. flow curve in percent.
    - Brake horsepower vs. flow curve.
    - Speed of rotation.
    - Impeller size and number.
    - Certified bearing life calculations in accordance with AFBMA L-10 standards.
    - A table with a listing of a minimum of five test points throughout the pump range including shut off, rated capacity and run out. Show capacity, total head, BHP, efficiency, NPSHr and speed.
  - MSA shall witness factory testing – minimum 3-week notice required.

- PUMP REQUIREMENTS:
  - Service: Raw Water
  - Rated Design Flow: 500 gpm
  - Rated TDH @ Rated Flow: 271 feet
  - Minimum Shut-off Head: 300 feet
  - Flow at Runout: 750 gpm
  - Minimum Efficiency at Design Point: 75%
  - Maximum Speed: 3,600 rpm
  - NPSHr @ Design Point: 24.3 feet
  - Pump Rotation: Left Hand (counterclockwise)
  - Pumps and motor to be equipped with design features that allow for long term installation of vibration and temperature monitoring equipment as well as laser alignment tools.
    - Mounting points: ¼-28 UNF x .25 in deep typical.
  - Motor horsepower: 60 HP
  - Motor Voltage: 460 3-Phase
  - Suitable for VFD operation.

- MATERIALS OF CONSTRUCTION:
  - Pump Casing – Cast Iron, ASTM A48
- Impeller – Stainless Steel, 316
- Shaft - Carbon Steel, AISI C1045
- Case Wear Ring – Stainless Steel, 416
- Sleeve – Stainless Steel, 316
- Sealing – Mechanical Seal, john Crane, Type 21, hot water 225 deg F max
- Sleeve: Stainless Steel, AISI 316
- No material in contact with the pumped liquid shall contain lead or have any compositions containing lead.

**TOOLS AND SPARE PARTS**
- The following tools/spares shall be furnished along with cut sheets, in original packaging:
  - One complete set of pump bearings per pump size.
  - One set of wearing rings with all parts required for replacement per pump size.
  - One shaft sleeve per pump size.
  - One mechanical seal per pump size.
  - One set of special tools per pump size, in metal storage box.