

## SPECIFICATIONS XA Flex-Coupled End Suction Pumps

### SERIES 3000

### XA FLEX-COUPLED END SUCTION PUMPS

#### SECTION 1.0 - GENERAL

The contractor shall furnish materials, equipment and labor to furnish, install and test the pumping system complete with pumps, motors, mounting bases, piping, valves and appurtenances as indicated on the contract documents and drawings and as herein specified.

#### SECTION 1.1 - INSTALLATION

The contractor shall insure that the pumps and motors are properly installed with no piping strain transmitted to the pump casing. The contractor shall also insure that the pumps and motors have been field aligned and properly commissioned and that all pump manufacturer Pre-Start Up, Start Up and Field Testing reports have all been fully filled out and returned to the pump manufacturer. All pump and motor assemblies shall be installed per the Installation, Operation & Maintenance manuals available from the pump manufacturer.

#### SECTION 1.2 - RESPONSIBILITY

To assure a properly integrated and compatible system, all equipment described within these specifications shall be provided by the pump manufacturer, who will assume full responsibility for the proper operation of the pumps and motors.

#### SECTION 1.3 - SUPERVISION

The contractor shall arrange for the pump manufacturer to provide a factory trained representative as required for the supervision of the installation, pre-start up, start up, final field acceptance testing and to provide training to the maintenance & operations people for the proper operation of the equipment once accepted.

#### SECTION 1.4 - REFERENCE STANDARDS

The work in this specification is subject to the requirements of the applicable portions of the following standards:

- Hydraulic Institute (HI)
- American Water Well Association (AWWA)
- IEEE Standards
- NEMA Standards
- OSHA Rules and Regulations

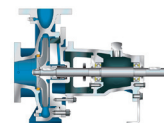
### SECTION 2 - PRODUCTS

#### SECTION 2.1 - GENERAL DESCRIPTION

The pump shall be a single-stage centrifugal end suction, CPS-Pumps 3000 Series XA or approved equal. Pre-approval must be obtained a minimum of ten (10) days prior to the bid date.

#### SECTION 2.2 - MATERIALS OF CONSTRUCTION

CASING.....	CAST IRON (ASTM A48, CLASS 30)
IMPELLER.....	304 STAINLESS STEEL
SHAFT.....	420 STAINLESS STEEL (AISI 420)
SHAFT SLEEVE.....	304 STAINLESS STEEL
CASE WEAR RING.....	BRONZE (ASTM A954)
POWER FRAME.....	CAST IRON (ASTM A48, CLASS 30)



REAR COVER.....CAST IRON (ASTM A48, CLASS 30)

## SECTION 2.3 - CASING:

The casing is constructed of ASTM A48 class 30 high tensile cast iron or other specified material. It is of the single volute design with single suction and has a replaceable bronze case wear ring standard. Heavy wall allows for generous corrosion allowance with a 20 year design life. Suction & discharge flanges are cast of 250 PSI dimensions and all models feature a 250 PSI case working pressure. Each suction and discharge flange is drilled and tapped for easy connection to the system piping. The suction and discharge flanges also feature a tapped connection for a suction and discharge gauge. The suction has a cast integral vortex suppressor to minimize inlet vortices and the discharge is of the centerline type. On XA models, the centerline discharge transmits any residual pipe strain to the cast integral feet on the casing minimizing moment forces that can be catastrophic on casings with a tangential discharge. XA models feature back pullout allowing the removal of the power frame assembly without disturbing suction or discharge piping.

## SECTION 2.4 - IMPELLER:

The impeller is of the single suction, enclosed, non-overloading type. It is constructed of investment cast 304 stainless steel or other specified material, machined, dynamically & hydraulically balanced. The impeller is keyed to the shaft and secured by locking impeller nut and lock washer. Optional impeller wear rings are available upon request. Impellers are furnished with back pump out vanes or double case wear rings to balance axial thrust.

## SECTION 2.5 - SHAFT SLEEVE:

The shaft sleeve is constructed of a heavy wall stainless steel or other specified material and machined to precision tolerances. An internal o-ring is designed to keep fluid from leaking under the shaft sleeve. The shaft sleeve is keyed to prevent rotation during operation.

## SECTION 2.6 - CASING WEAR RING:

The case wear ring is made of bronze or other specified material. It is designed with a large wearing surface with the diameter at wearing surface reduced to a minimum and is firmly secured in the casing by interference fit. The casing is undercut allowing the case wear ring to be removed without any special machining required.

## SECTION 2.7 - SHAFT:

The XA shaft is manufactured of corrosion resistant 420 stainless steel, ground and polished to a smooth external surface. It is designed for extra stiffness to avoid all critical speeds in operation and is threaded for bearing lock nuts. The portion of the shaft that is exposed to the pumped fluid is covered with a renewable 304 stainless steel shaft sleeve, locked tightly against the impeller. The shaft is designed to use an inboard and outboard deep groove ball bearing for rotor support.

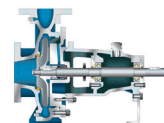
## SECTION 2.8 - REAR COVER:

The rear covers are extra deep, being designed for packing and lantern ring or component mechanical seals. An internal Plan 1 flush is standard. If the pumped fluid is not suitable for clean flushing then an external flush plan can be supplied upon request.

Each stuffing box shall be provided with rings of non-asbestos packing material constructed of interwoven graphite coated acrylic. An investment cast 304 stainless steel lantern ring shall also be fitted in each stuffing box to assure proper flushing of all packing rings.

## SECTION 2.9 - PACKING HOUSING GLAND:

Each stuffing box shall be provided with a two piece gland to securely hold the packing in place. The packing gland must be split to permit easy access to the packing without disassembly of the pump casing. Control of packing leakage shall be accomplished by the use of adjustable studs or hinge bolts.



## SECTION 2.10 - POWER FRAME:

XA models feature a power frame constructed of ASTM A48 class 30, high tensile cast iron and provides support for the inboard and outboard bearings. The power frame is fitted with two single row, deep groove ball bearings of ample capacity designed to account for radial as well as axial loads in either direction. Each bearing is pressed on to the shaft and located against precision machined shoulders assuring proper alignment and location. Bearing caps with lip seals provide protection to the bearings by keeping dust and dirt out of the power frame. Each bearing is of the oil-lubricated type for quiet operation and the power frame has oil level indicator integral for inspection of proper level.

## SECTION 2.11 - XA BEARINGS:

Both the inboard and outboard bearings are of the single row, deep groove type, precision grade. Each bearing is of the extra large capacity for both radial and axial loads and both bearings are confined rigidly in the bearing housing. All bearings are sized to maintain a minimum L10 bearing life of 50,000 hours with many models exceeding 100,000 hours standard. Each bearing is designed for oil-lubrication and a water slinger is provided to prevent leakage from the stuffing box from entering the bearing housing. Grease lubrication with a grease fitting is optional. Each bearing housing is sealed from water leakage by the use of an oil lip seal. Bearing isolators are available upon request. Double row outboard and/or double row inboard bearings are available upon request.

## SECTION 2.12 - COUPLING:

A flexible coupling shall be provided to connect the pump shaft to the motor shaft. The coupling hubs shall be constructed of metal and an elastomeric rubber inset shall be placed between the hubs. The entire coupling assembly must be enclosed in a coupling guard.

## SECTION 2.13 - BASEPLATE:

The pump and motor assembly shall be mounted on a groutable, non-drip rim or drip rim baseplate. The baseplate shall be sufficient rigid to completely support the pump and motor assembly without the use of additional supports or members.

## SECTION 2.14 - MOTOR:

The motor shall be of the horizontal design and in accordance with the latest NEMA standards and shall have the following characteristics:

ENCLOSURE.....OPEN DRIP PROOF  
MOTOR TYPE.....T-FRAME  
NUMBER OF PHASES.....THREE (3)  
FREQUENCY.....60  
VOLTAGES.....230/460  
SPEED.....1200, 1800 or 3600 RPM  
HORSEPOWER.....HP

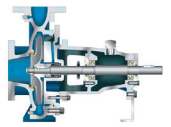
Each motor shall have a sufficient horsepower rating to operate the pump at any point on the performance curve without overloading the nameplate horsepower rating of the motor, regardless of service factor. The motor shall have a service factor of at least 1.15. The service factor is reserved for variations in voltage and frequency.

## SECTION 3 - PERFORMANCE

### SECTION 3.1 - CONDITIONS OF SERVICE

The following conditions of service shall be strictly adhered to:

NUMBER OF UNITS.....



TYPE OF DRIVE..... (VARIABLE OR CONSTANT)  
DISCHARGE SIZE, MINIMUM..... (INCHES)  
SUCTION SIZE, MINIMUM..... (INCHES)  
DESIGN CAPACITY..... (US GPM)  
DISCHARGE PRESSURE..... (FEET)  
EFFICIENCY AT DESIGN, MINIMUM..... (%)  
ROTATING SPEED, MAXIMUM..... (RPM)  
SHUT-OFF HEAD, MINIMUM..... (FEET)  
BRAKE HORSEPOWER, MINIMUM..... (HP)  
NPSHR AT DESIGN, MAXIMUM..... (FEET)

### SECTION 3.2 - INSPECTION & FACTORY TESTS

Each centrifugal pump furnished in these specifications shall be non-witnessed tested at the factory to verify individual performance. Performance testing shall be done in accordance with current Hydraulic Institute standards. Certified copies of all testing shall be sent to the engineer prior to shipment. Each pump assembly shall be non-witnessed hydrostatically tested per the current Hydraulic Institute standards prior to final pump and motor base mounting.

### SECTION 3.3 - INSTALLATION AND ACCEPTANCE TESTS

The pumping assembly shall be installed in accordance with the Installation, Operations and Maintenance manual provided by the pump manufacturer. Installation shall also include furnishing all oil and grease for initial operation. The grades of oil and grease can be found in the Installation, Operation and Maintenance manual provided by the pump manufacturer.

