

## SPECIFICATIONS AQU Close-Coupled End Suction Pumps

### SERIES 3000

### AQU CLOSE-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

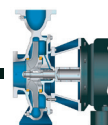
### SECTION 2 - PRODUCTS

#### SECTION 2.1 - GENERAL DESCRIPTION

The pump shall be a single-stage centrifugal end suction, CPS-Pumps 3000 Series AQU 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)             |
| MOTOR BRACKET.....  | 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 AQU 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. AQU models feature back pullout allowing the removal of the shaft & bracket 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.

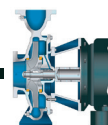
## SECTION 2.7 - SHAFT:

The AQU 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 couple to the motor shaft on a standard NEMA or IEC motor. CPS-Pumps is one of the only pump manufacturers to feature an independent & replaceable shaft in a close-coupled pump. This design allows the end user to replace a motor on our close-coupled pumps without complete pump disassembly, something that is required on competitor models that use JM shafted motors. This design also offers the option of packing and/or mechanical seal. In addition, if the end user breaks a shaft in operation this part can be easily replaced as it is not integral to the motor assembly. The precision bore of the pump shaft also eliminates the need to do pump alignment in the field greatly simplifying the installation process.

## 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 - MOTOR BRACKET:

The AQU motor bracket is constructed out of heavy duty ASTM A48 high tensile class 30 cast iron. The pump side of the motor bracket has a precision machined register to keep pump alignment and concentricity. The motor side of the bracket has a precision machined register to mount to the motor. These two registers allow the pump to be assembled correctly without any need for pump alignment in the field.

## SECTION 2.11 - 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 2.12 - 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 2.13 - 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.

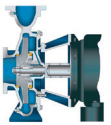
AQU models utilize NEMA or IEC C-face motors. This design allows for the removal of the motor without disturbing any item within the pump. This flexibility allows the user to stock fully assembled wet ends less motors. To remove the motor, two to eight set screws need to be loosened, remove the four bolts that hold the motor in location and then remove the motor. This motor concept allows the user to use nearly any motor enclosure such as ODP, TEFC, Explosion Proof, Corro-Duty and Wash-Down duty, enclosures that are not available in other close-coupled designs.

## 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.

