

SPECIFICATIONS CNCV Flex-Coupled Vertical Non-Clog Pumps

SERIES 3300

CNC FLEX-COUPLED VERTICAL NON-CLOG 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

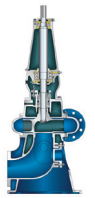
SECTION 2 - PRODUCTS

SECTION 2.1 - GENERAL DESCRIPTION

The pump shall be a single-stage centrifugal end suction, CPS-Pumps 3300 Series CNCV 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
SUCTION STAND.....	CAST IRON (ASTM A48, CLASS 30)
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 A536 high tensile ductile iron or other specified material. It is of the single volute design with single suction. 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 discharge portion of the casing assembly also features an integral clean-out port to remove obstructions that enter the pump casing. On CNC models, the tangential discharge maintains a very high efficiency and allows the casing to be rotated to meet job-site requirements. CNC models feature back pullout allowing the removal of the power frame assembly without disturbing suction or discharge piping. CPS-Pumps is one of only a select number of pump manufacturers in the world that offers end suction pumps in a variety of other cast materials including all bronze, all stainless steel and high chrome construction. These are available upon request.

SECTION 2.4 - IMPELLER:

The impeller is of the single suction, enclosed, two-vane 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. The two vane impeller design allows for limp and stringy solids to be pumped with solids passing through a 7 inch spherical solid. Impellers are furnished with front & rear pump out vanes to keep solids from collecting in the casing area.

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 - SHAFT:

The CNC 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 2.7 - REAR COVER:

The rear covers are extra deep, being designed for packing and lantern ring or component mechanical seals. The FML rear cover uses flow modifiers to stop solids from collecting around the mechanical seal. If the pumped fluid is not suitable for clean flushing then an external flush plan can be supplied upon request. Five different type of rear covers are available allowing a complete engineered solution base on job-site requirements.

CPS-Pumps offers many different type of packing and mechanical seals. Packing can be supplied in carbon graphite and/or polymer designs. A variety of component and cartridge mechanical seals are available upon request.

SECTION 2.8 - 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 2.9 - POWER FRAME:

CNC 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 a double row, deep groove ball bearing at the outboard location and a single row, deep groove ball bearing at the inboard location. Each bearing is 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. The power frame has bearing isolators standard to 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. The power frame has a threaded bearing carrier that is used to adjust impeller running clearances. The bearing carrier has blocks cast on to its outer diameter that are calibrated to 0.002 inch increments allowing an accurate adjustment without the use of shims or feeler gauges.

SECTION 2.10 - SUCTION ELBOW/STAND:

CNCV models feature a suction elbow constructed of ASTM A48 class 30, high tensile cast iron and provides support for the entire pumping assembly. The suction elbow also features an integral clean-out port to remove obstructions that enter the suction elbow.

SECTION 2.11 - CNC BEARINGS:

The inboard bearing is of the double row, deep groove type and outboard bearing is 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 is available upon request. Each bearing housing is sealed from water leakage by the use of a bearing isolator. Double row outboard 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.