# GENERAL

## SECTION INCLUDES

### Closed-coupled, in‑line centrifugal pumps.

### Separately coupled, base-mounted, end-suction centrifugal pumps.

### Automatic condensate pump units.

## REFERENCE SECTION 23 05 00 FOR THE FOLLOWING:

### References.

### Performance requirements.

#### Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non‑overloading in parallel or individual operation, and operate within + 10 percent of scheduled performance and published operating curve.

### Submittals.

### Operation and maintenance data.

### Qualifications.

### Delivery, storage and handling.

### Extra materials.

#### Provide one set of mechanical seals and gaskets for each pump.

# PRODUCTS

## CLOSED-COUPLED, IN‑LINE CENTRIFUGAL PUMPS

### See pump schedule on drawings for performance requirements.

### Type: Horizontal shaft, single stage, direct connected, with resiliently mounted motor for in‑line mounting, oil lubricated, for 175 psig maximum working pressure.

### Casing: Cast iron, with flanged pump connections.

### Impeller: ASTM B 584 Dynamically balanced bronze, keyed to shaft. For constant speed pumps, trim impeller to match specified performance.

### Bearings: Two, oil lubricated bronze.

### Shaft: Alloy or stainless steel with copper or bronze sleeve, integral thrust collar.

### Seal: Mechanical Carbon rotating against a stationary ceramic seat, 250 degrees F maximum continuous operating temperature.

### Drive: Flexible coupling.

## SEPARATELY COUPLED, BASE MOUNTED, END-SUCTION CENTRIFUGAL PUMPS

### See pump schedule on drawings for performance requirements.

### Type: Horizontal shaft, single stage, direct connected, oil lubricated, for 175 psig maximum working pressure.

### Casing: Cast iron, with suction and discharge gage ports, renewable bronze casing wearing rings, seal flush connection, drain plug, flanged suction and discharge.

### Impeller: ASTM B 584 Dynamically balanced bronze, keyed to shaft. For constant speed pumps, trim impeller to match specified performance.

### Bearings: Grease-lubricated ball bearings in cast-iron housing with grease fittings.

### Shaft: Alloy or stainless steel with copper or bronze sleeve, integral thrust collar.

### Seal: Mechanical Carbon rotating against a stationary ceramic seat, 250 degrees F maximum continuous operating temperature.

### Drive: Flexible coupling.

### Shaft Coupling: Molded rubber insert and interlocking spider capable of absorbing vibration. Couplings shall be drop-out type to allow disassembly and removal without removing pump shaft or motor. EPDM coupling sleeve for variable-speed applications.

### Coupling Guard: Dual rated; ANSI B15.1, Section 8; OSHA 1910.219 approved steel; removable; attached to mounting frame.

### Mounting Frame: Welded-steel frame and cross members, factory fabricated from ASTM A 36/A 36M channels and angles. Fabricated to mount pump casing, coupling guard, and motor.

### Baseplate: Cast iron or fabricated steel.

## AUTOMATIC CONDENSATE PUMP UNITS

### See pump schedule on drawings for performance requirements.

### Type: Packaged units with corrosion-resistant pump, plastic tank with cover, and automatic controls. Include check valve and a 72 inch minimum, electrical power cord with plug.

## PUMP SPECIALTY FITTINGS

### Suction Diffuser

#### Angle pattern.

#### 175 psig pressure rating, cast-iron or ductile-iron body and end cap, pump-inlet fitting.

#### Cylinder stainless steel strainer with 3/16 or 5/32 inch diameter openings, disposable fine mesh stainless steel strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning Bronze or stainless-steel straightening vanes.

#### Drain plug.

#### Factory-fabricated support.

#### Blowdown tap

#### Gage tap

### Tripe-Duty Valve: Triple duty valves are not allowed.

# EXECUTION

## PREPARATION

### Verify that electric power is available and of the correct characteristics.

## INSTALLATION

### Install in accordance with manufacturer's instructions.

### Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.

### Provide automatic condensate pump unit at each location where gravity drainage is not possible. Coordinate with other trades.

### Install check valve and gate or ball valve on each condensate pump unit discharge.

### Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For close coupled or base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.

### Provide line sized shut‑off valve and pump suction fitting, flexible connection on pump suction, and line sized soft seat check valve, balancing valve, flexible connection and line sized shut-off valve on pump discharge. Refer to piping schematics and details.

### Provide air cock and drain connection on horizontal pump casings.

### Install base mounted pumps on concrete housekeeping base, with anchor bolts, set and level, and grout in place. Refer to Section 23 05 00.

### Provide pump suction fitting on suction side of base mounted centrifugal pumps. Remove temporary strainers after cleaning systems.

### Support pump fittings with floor mounted pipe and flange supports.

### Install valves that are the same size as piping connected to pumps.

### Install suction and discharge pipe sizes equal to or greater than diameter of pump nozzles.

## START-UP AND COMMISSIONING

### Start-up pump in accordance to manufacturer written instructions.

### Before and after start-up, perform the following preventative maintenance operations and checks:

#### Lubricate bearings.

#### Check, align and certify alignment of base mounted pumps prior to start-up.

#### After pump is started, check for proper rotation, proper mechanical operation and motor load to ensure that pump is not overloaded. Close pump balancing valve as required to bring pump motor load within motor nameplate data.

#### Check pumps to ensure it is not air bound or cavitating.

#### After sufficient run time, remove, check and clean strainer as required. Repeat cleaning strainer until system is sufficiently flushed. Refer to Section 23 25 00, Chemical Water Treatment.

#### After completing start-up, replace pump strainer with permanent strainer.

### Coordinate pump testing, adjusting and balancing with UNL Balancing / Commissioning Team. Complete additional preliminary work as required.

END OF SECTION 23 21 23