

OPTIONAL :

All Stainless
Steel Construction

**K4V**

4" Submersible, Enclosed Impeller

2 VANE ENCLOSED IMPELLER

- Efficient operation, non-clogging
- Most energy efficient design
- Pump-out vanes, prevents material build-up
- Pressure balance on shaft seal for long life
- Positive pumping action through impeller

STRONG PERFORMANCE

- Ideal for higher flows, lower heads
- Operate to shut-off head without damage
- Non-overloading performance curve

LONG SERVICE LIFE

- Dual silicon carbide shaft seals
- Low motor operation temperatures
- Continuously lubricated bearings
- Premium ball bearing construction
- Epoxy potted cord entry

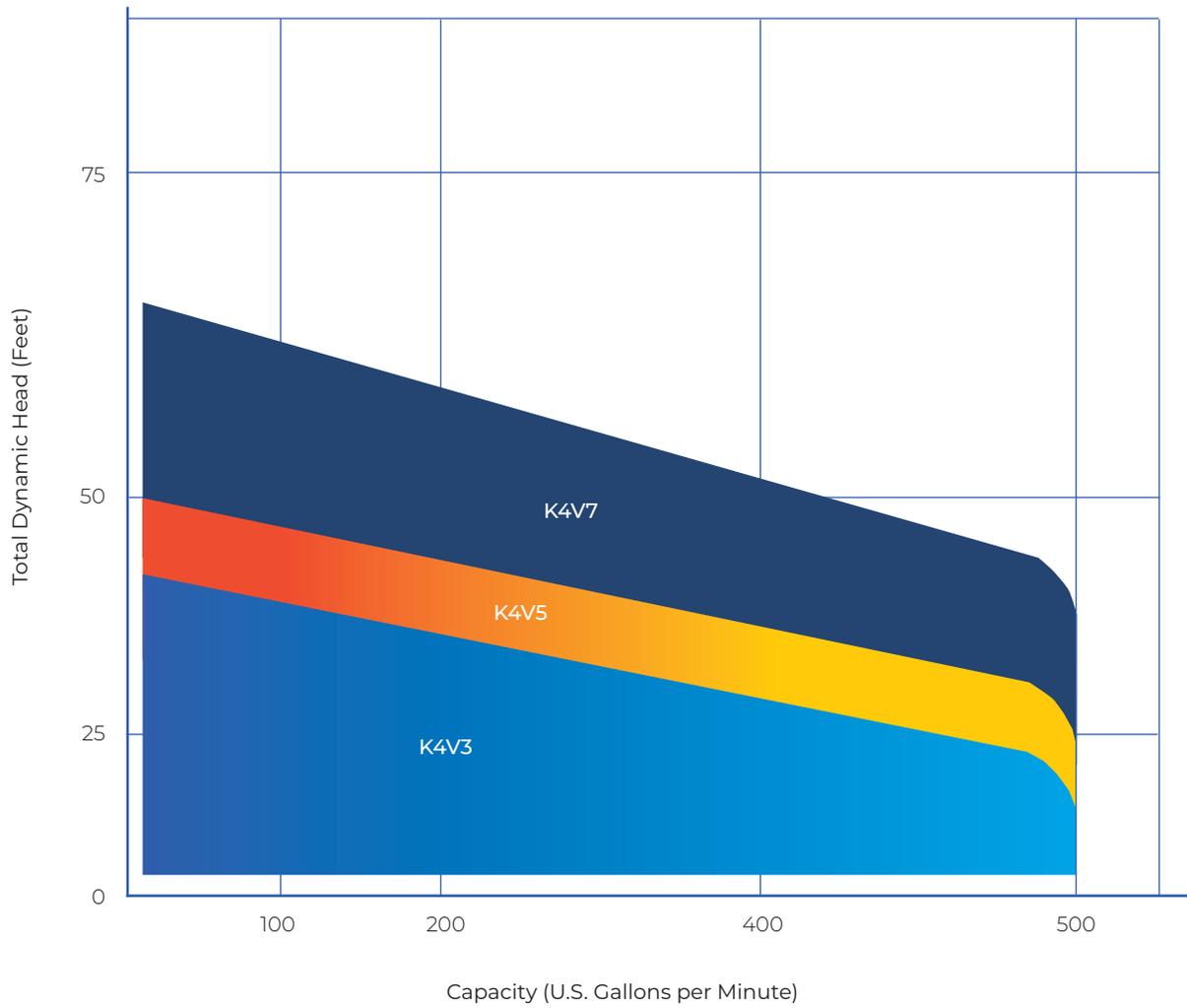
LOW MAINTENANCE

- Easily replaceable impeller wear ring restores original pump performance
- Unobstructed impeller passageway
- Crit-resistant silicon carbide shaft seals
- Large, 3" diameter solids handling
- High service factor motor handles tough electrical operating conditions

CAPABILITIES:

- Flows to 500 GPM
- Heads to 65 Feet
- HP Range 1 - 7.5 HP
- Voltage/Phase Options 200 / 230 / 460, 1 or 3 Phase
- Discharge Connections 4" ANSI Class 150lb Horizontal Flange
- Motor Speeds 1150 / 1750 RPM
- Solids Handling 3"
- Impeller 2 Vane, Enclosed, Balanced
- Motor Service Factor 1.15

Performance





1. TRIPLE SEALED CABLE ENTRANCE

Stainless steel strain relief cord grip with compression grommet protects outer cord jacket. Epoxy filled inner cord cap with individually soldered wires provide anti-wicking moisture protection to the motor even if power cable is cut or damaged. 40' U/L power & control cords.

2. MODULAR PUMP DESIGN

Commonality of parts across the Keen product line minimizes the amount of parts required for servicing. Heavy-duty ASTM A48, Class 35 cast iron components.

3. STRONG MOTOR

Powerful high torque motor for reliable pump operation.

- 208 / 230 volt, 1-phase
- 208 / 230 / 460 volt, 3-phase

Pressed stator securely holds motor and efficiently transfers heat. Class F insulation with overload protection in air filled chamber for cool operation and long motor life.

4. SOLID BEARING SUPPORT

Motor / Pump shaft securely held with upper and lower ball bearings rated for long 50,000 hour B-10 life.

5. SEVERE DUTY DUAL MECHANICAL SEALS

Dual silicon carbide mechanical shaft seals provide twice the moisture and grit protection for the motor. Dual seals are housed in a secondary oil filled seal chamber. Tougher silicon carbide seals better handles sand, grit and abrasive materials.

6. MOISTURE DETECTION

Seal leak probe signals alarm in control panel for scheduled maintenance.

7. HIGH EFFICIENCY HYDRAULIC DESIGN

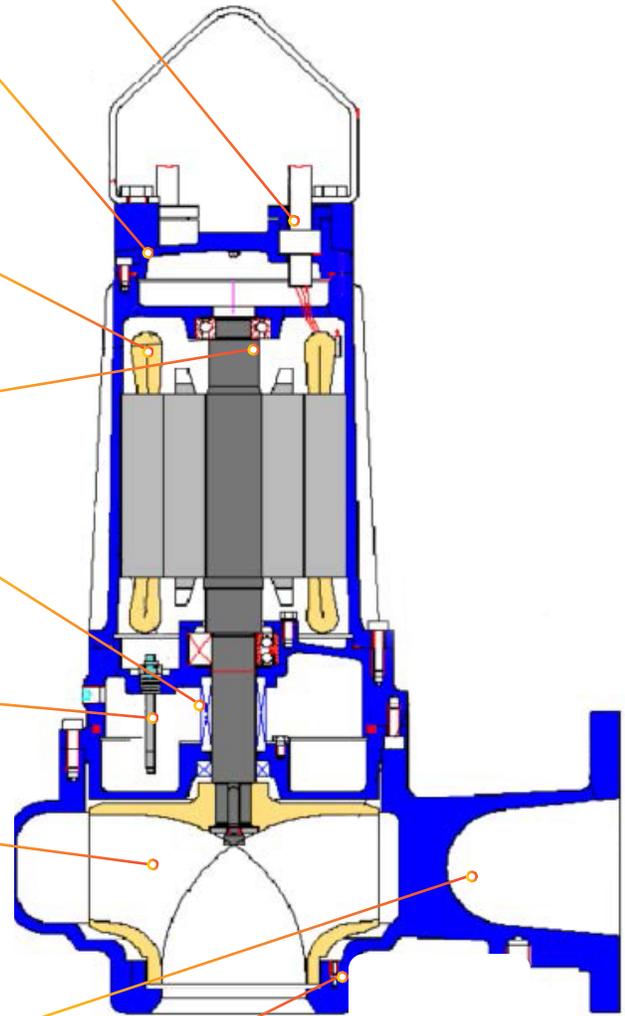
Highly efficient enclosed 2 vane impeller easily passes 3" diameter solids without blockage. The strong ductile iron impeller features backside pump out vanes, keeping the lower mechanical seal clean and pressure compensated for longer life. Dynamically balanced for smooth quiet operation and long bearing life.

8. 4" DISCHARGE FLANGE

4" horizontal, 125# ANSI discharge flange. Industry standard, 8-bolt pattern.

9. HIGH PERFORMANCE WEAR RING

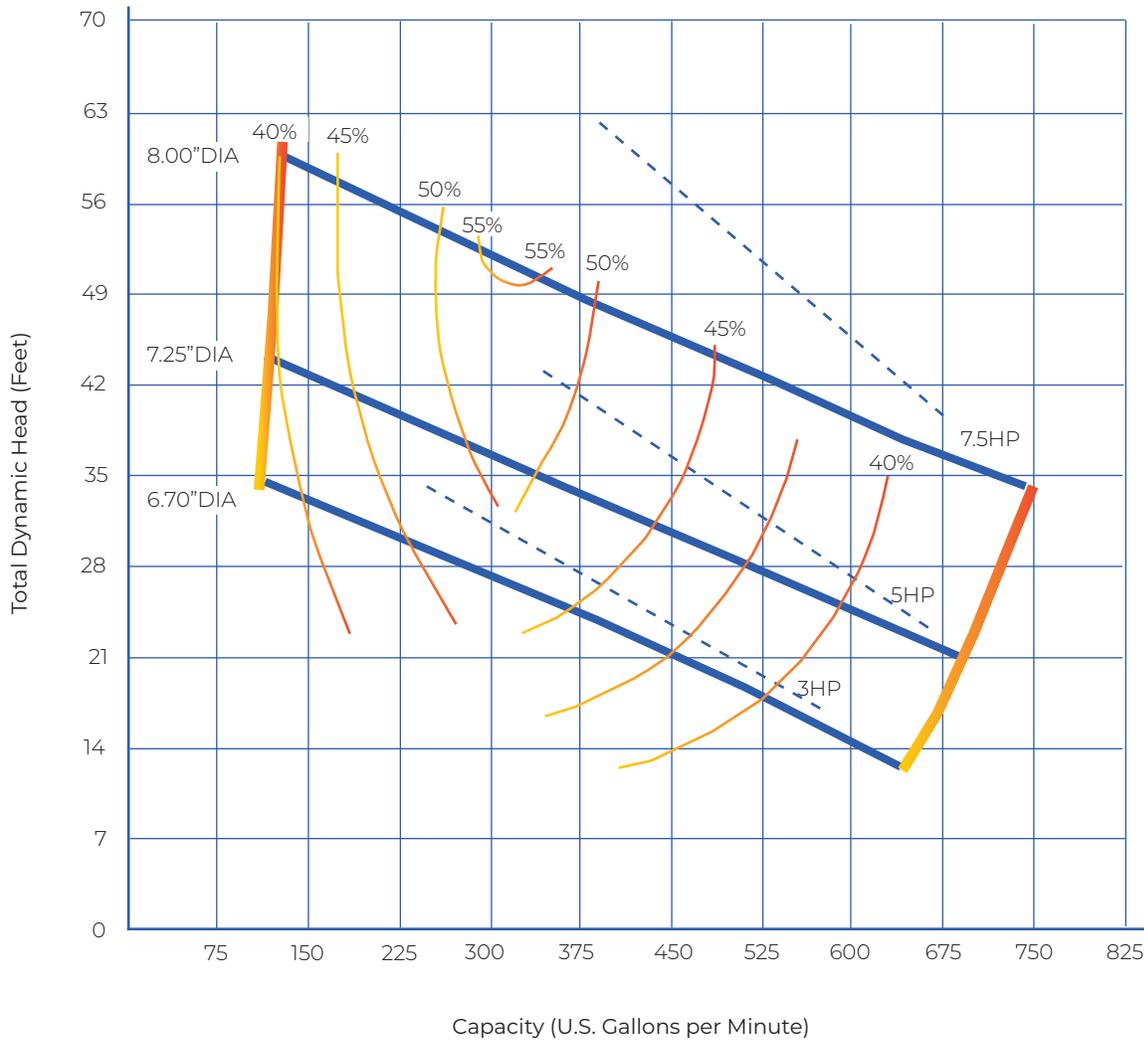
Assists impeller in providing higher performance efficiencies and prevention of recirculation losses. Bronze ring will not corrode or deteriorate from liquid being pumped. Bronze ring reduces wear to stronger ductile iron impeller in sandy or gritty applications. Easily serviceable and replaceable.



| PUMP SERIES | K4V | | 4" SUBMERSIBLE SEWAGE PUMPS | | |
|-------------|----------|-----------|-----------------------------|--------|----|
| Speed | 1750 RPM | Discharge | 4" | Solids | 3" |

GPM: _____ TDH: _____

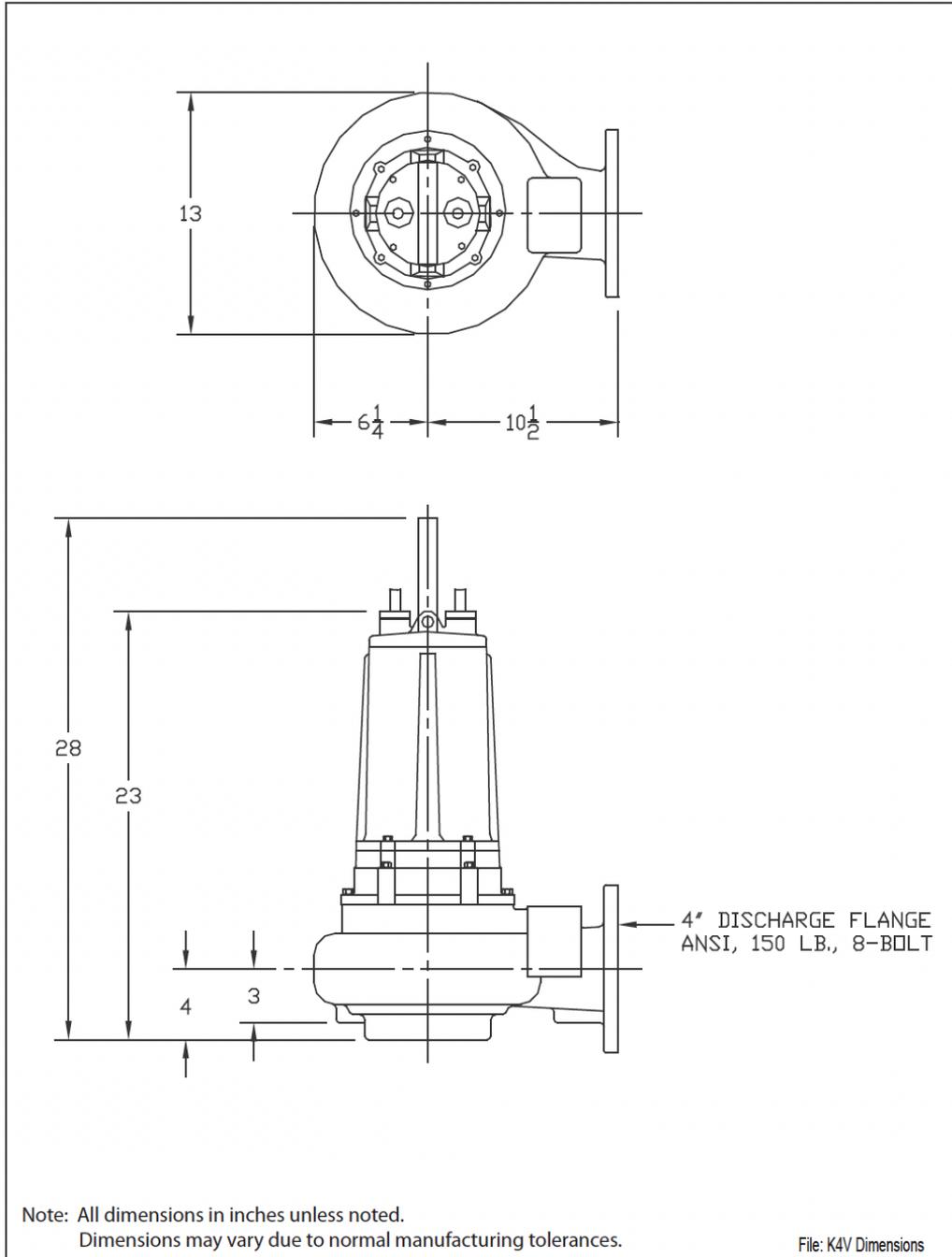
Performance



The curves reflect maximum performance characteristics without exceeding full load. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F and 1280 feet site elevation.

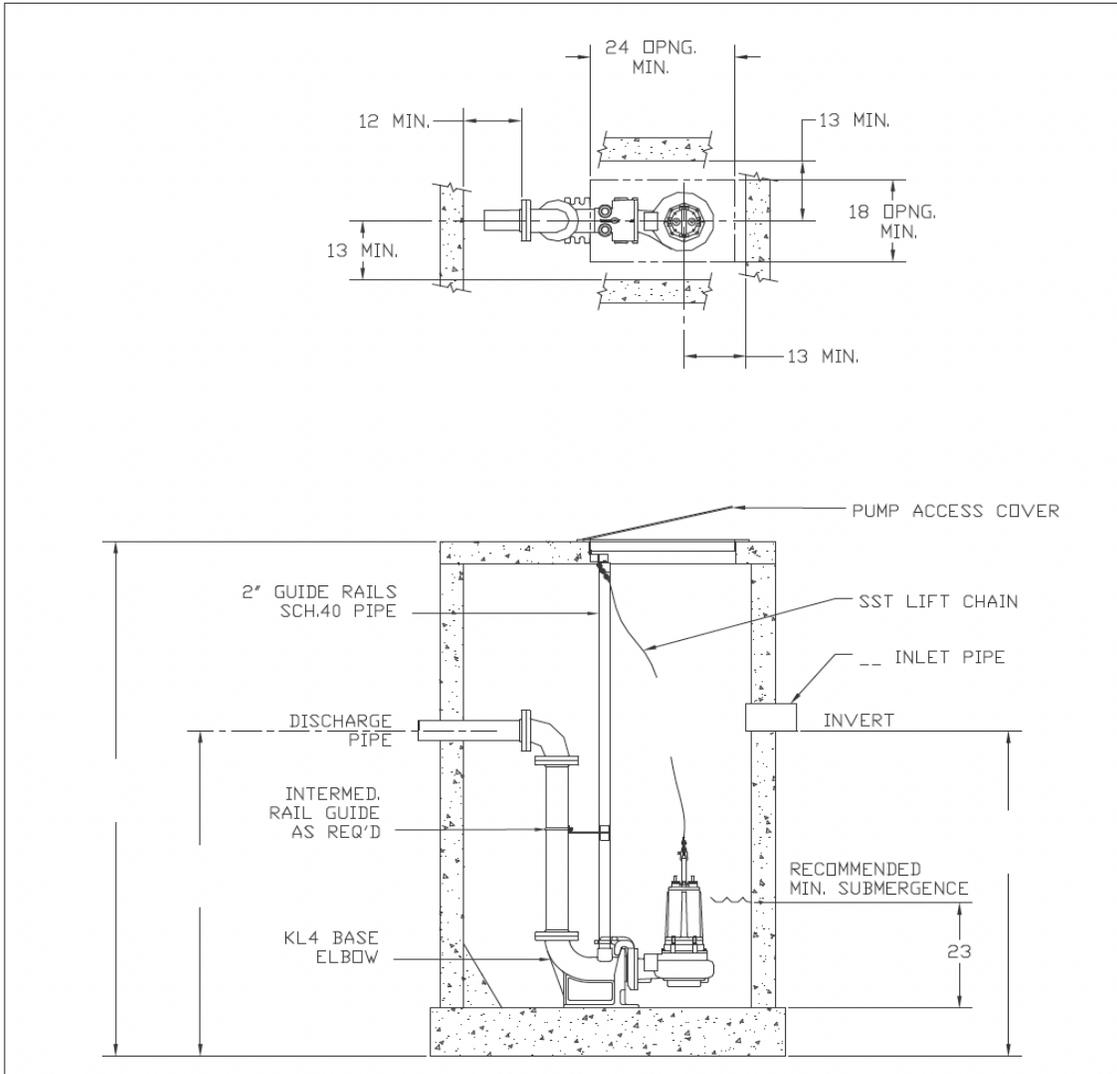


| | | |
|------------------|-----|-----------------------------|
| PUMP SERIES | K4V | 4" SUBMERSIBLE SEWAGE PUMPS |
| DIMENSIONAL DATA | | |





| | | |
|---------------------------------------|-----|-----------------------------|
| PUMP SERIES | K4V | 4" SUBMERSIBLE SEWAGE PUMPS |
| SIMPLEX INSTALLATION DIMENSIONAL DATA | | |



Notes:

1. All dimensions in inches unless noted.
2. Refer to pump dimension and liftout dimension sheets for more details.
3. Recommended minimum submergence levels noted.
4. Discharge base elbow must be placed above sump bottom as noted.
5. Dimensions may vary due to normal manufacturing tolerances.
6. If discharge pipe is larger than discharge elbow, eccentric reducer must be used limited to 2X larger maximum.

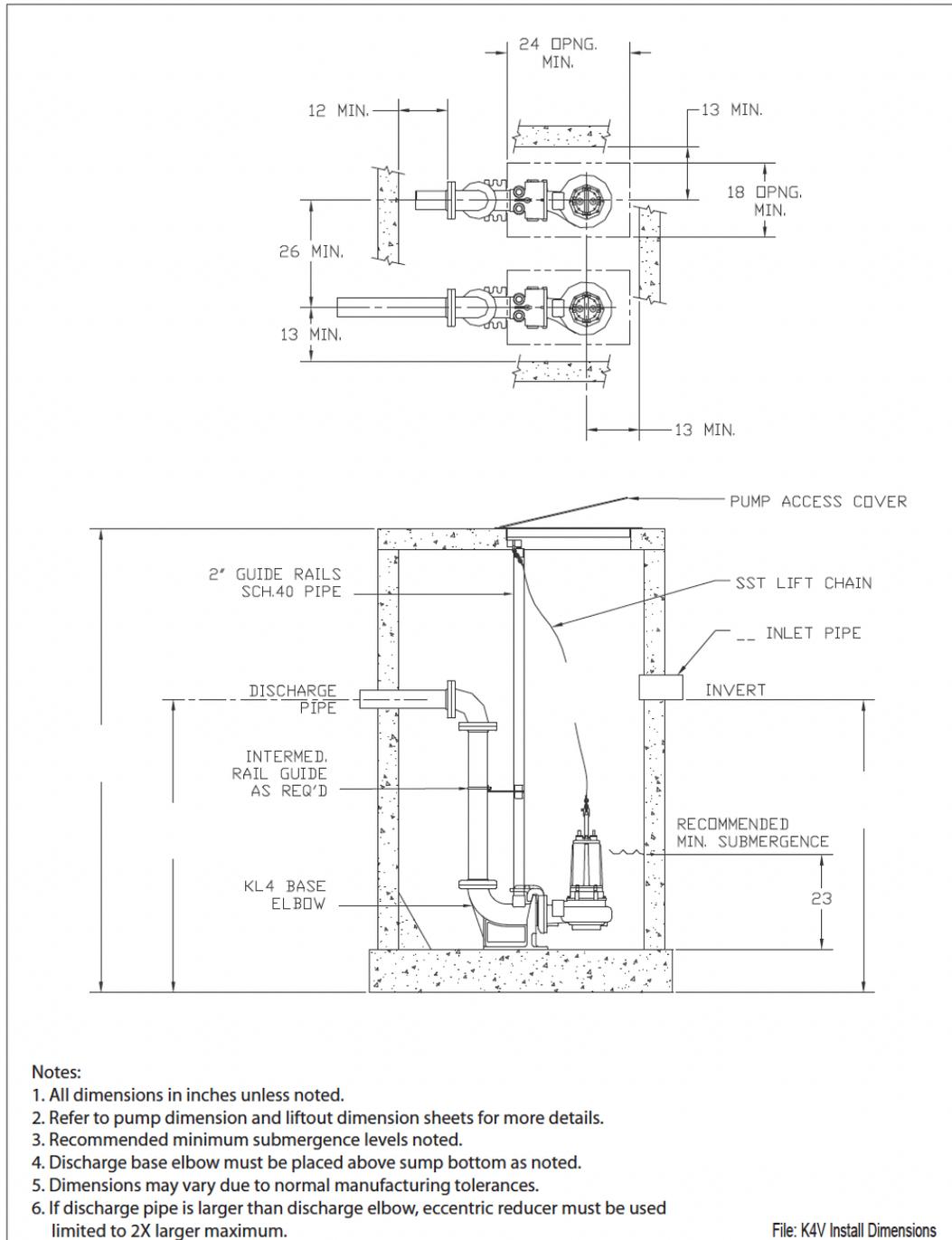
File: K4V Install Dimensions

PUMP SERIES

K4V

4" SUBMERSIBLE SEWAGE PUMPS

DUPLIX INSTALLATION DIMENSIONAL DATA





THERMAL DATA

| | | | |
|-----------------|-----------------|---|--|
| Maximum Liquid | 140° F (60° C) | | |
| Maximum Stator | 311° F (155° C) | | |
| Heat Sensor | Open: | 257° F (125° C) Max. / 239° F (115° C) Min. | |
| | Closed: | 194° F (90° C) Max. / 119° F (48° C) Min. | |
| Oil Flash Point | 390° F (199° C) | | |

ELECTRICAL DATA

| | | | | |
|--------------------|-------------|---------------|---------------|---------------|
| RPM | 1750 | | | |
| Electrical Ratings | Heat Sensor | 24VDC, 5AMPS | 115VAC, 5AMPS | 230VAC, 5AMPS |
| | Seal Fail | 300VAC 5mAMPS | | |
| Voltage Tolerance | ± 10% | | | |

| HP | VOLTS | PHASE | NEC CODE | SERVICE FACTOR | FULL LOAD AMPS | SF AMPS | LOCKED ROTOR AMPS | RUN KW | START KVA | RUN KVA |
|-----|-------|-------|----------|----------------|----------------|---------|-------------------|--------|-----------|---------|
| 3 | 208 | 1 | G | 1.2 | 19.1 | 22.9 | 89.8 | 3.3 | 18.6 | 4.0 |
| | 230 | | | | 17.2 | 20.6 | 80.8 | | | |
| 3 | 208 | 3 | L | 1.2 | 16.3 | 19.6 | 82.1 | 4.5 | 29.5 | 5.6 |
| | 230 | | | | 14.1 | 16.9 | 73.9 | | | |
| | 460 | | | | 7 | 8.4 | 37.1 | | | |
| 5 | 208 | 1 | G | 1.2 | 37.1 | 44.5 | 148.3 | 6.5 | 30.7 | 7.8 |
| | 230 | | | | 34.3 | 41.2 | 133.4 | | | |
| 5 | 208 | 3 | L | 1.2 | 21.1 | 25.3 | 109.8 | 5.8 | 39.1 | 7.6 |
| | 230 | | | | 19 | 22.8 | 97.4 | | | |
| | 460 | | | | 9.6 | 11.5 | 49.2 | | | |
| 7.5 | 208 | 3 | K | 1.2 | 32.1 | 38.5 | 179.6 | 8.3 | 64.2 | 12.0 |
| | 230 | | | | 30.2 | 36.2 | 163.8 | | | |
| | 460 | | | | 15.1 | 18.1 | 78.3 | | | |

MOTOR EFFICIENCIES & POWER FACTOR

| HP | PHASE | MOTOR EFFICIENCY % | | | | POWER FACTOR % | | | |
|-----|-------|---------------------|-----------|----------|----------|---------------------|-----------|----------|----------|
| | | SERVICE FACTOR LOAD | 100% LOAD | 75% LOAD | 50% LOAD | SERVICE FACTOR LOAD | 100% LOAD | 75% LOAD | 50% LOAD |
| 3 | 1 | 66 | 66 | 64 | 56 | 87 | 83 | 79 | 70 |
| 3 | 3 | 71 | 70 | 69 | 63 | 81 | 80 | 79 | 71 |
| 5 | 1 | 65 | 65 | 64 | 59 | 86 | 83 | 76 | 62 |
| 5 | 3 | 78 | 78 | 75 | 70 | 79 | 76 | 71 | 60 |
| 7.5 | 3 | 76 | 76 | 74 | 69 | 75 | 70 | 64 | 54 |

K4V – SERIES (3 – 7.5 HP)

NON-CLOG SUBMERSIBLE PUMP SPECIFICATION

Furnish and install _____ submersible non-clog wastewater pump(s). The KEEN pump(s) shall be equipped with a _____ HP close coupled submersible electric motor, connected for operation on _____ volts, 1 or 3 phase, 60 hertz service, with _____ feet of heavy duty submersible electric power cable. Each pump shall be capable of producing _____ GPM at _____ feet TDH. The shut-off head shall be no less than _____ feet.

DESIGN – The KEEN pump(s) shall be capable of handling raw, unscreened sewage and shall be automatically and securely connected to the permanent discharge connection, guided by no less than two guide rails extending from the top of the station to the discharge connection. Sealing of the pumping unit to the discharge base elbow shall be accomplished by machined metal to metal watertight contact. The pump(s) shall be easily removed for inspection and service without the need for personnel to enter the wet-well. The entire pumping unit, including electric cable, shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 60 feet. No portion of the pump shall bear directly on the sump floor.

CONSTRUCTION – Major pump components shall be of gray cast iron, ASTM A-48, Class 35, with smooth surfaces devoid of blowholes or other irregularities. All exposed nuts or bolts shall be 304 stainless steel. All metal surfaces coming into contact with the pumpage, other than stainless steel, shall be protected by a factory applied spray coating of primer and an air dry enamel paint finish to the exterior of the pump. Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with o-rings. Fittings will be the result of controlled compression of rubber o-rings in two planes and o-ring contact of four sides without the requirement of a specific torque limit. No secondary sealing compounds, elliptical o-rings, grease or other devices shall be used.

COOLING SYSTEM – Motors are sufficiently cooled by the surrounding environment or by submergence in the media. A cooling jacket is not required.

CABLE / ENTRY SEAL – The power cable shall be sized in accordance with NEC standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket has a compression grommet compressing the exterior of the cable entry system.

MOTOR – The pump motor shall be an induction type, NEMA B design with a squirrel cage rotor, shell type design, housed in an air-filled, watertight chamber. The stator windings and stator leads shall be insulated with moisture resistant Class F insulation rated. The stator shall be dipped and baked in Class F varnish and shall be heat-shrink fitted into the motor housing. The use of bolts, pins, or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 104°F (40°C) and capable up to 20 evenly spaced starts per hour. The motor horsepower shall be adequate so that the pump is not overloading throughout the entire pump performance curve from shut-off through run-out. Thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The motor and pump shall be designed and assembled by the same manufacturer.



BEARINGS – The pump shaft shall rotate on two bearings. The upper motor bearing shall be a single ball type bearing to handle radial loads. The lower bearing shall be a double-row angular contact ball bearing to compensate for axial thrust and radial forces. Single row lower bearings shall not be considered acceptable. The minimum L-10 bearing life shall be 50,000 hours at any useable portion of the pump curve.

MECHANICAL SEAL – Each pump shall be provided with a mechanical shaft seal system consisting of two assemblies. The seals shall operate in a lubricant reservoir that hydro-dynamically lubricates the seal faces at a constant rate. The lower primary seal, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, silicon-carbide ring. The upper, secondary seal, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, silicon-carbide seal ring. The seals shall require neither maintenance nor adjustment and shall be capable of operating in either clockwise or counter clockwise direction of rotation without damage or loss of seal. For special applications, other seal face materials shall be available. Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal, shall be easily accessible from the outside. The seal system shall not rely upon the pumped media to operate dry without damage while pumping under load.

PUMP SHAFT – The pump shaft and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft; couplings shall not be acceptable. The pump shaft shall be 410 stainless steel.

IMPELLER – The enclosed, 2-vane impeller shall be of ductile iron, Class 35B, dynamically balanced, double shrouded non-clogging design having long through-let without acute turns. The impeller shall be capable of handling solids, fibrous materials, heavy sludge and other material found in wastewater. The impeller shall be keyed to the shaft, retained with an impeller bolt, capable of passing a 3-inch diameter solid. Mass moment of inertia calculations shall be provided by the pump manufacture upon request. Ceramic coating on impeller for anti-abrasion wear.

VOLUTE – The pump volute shall be gray cast iron, ASTM A-48, Class 35, single piece design with smooth passages large enough to pass any solids that may enter the impeller. A replaceable bronze wear ring system shall be utilized to provide efficient sealing between the volute and impeller suction inlet. Ceramic coating inside volute for anti-abrasion wear.

PROTECTION – All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. At 260°F (125°C) the thermal switches shall open to signal the control to stop the motor and activate the alarm. A leakage sensor shall be installed in the lubricant chamber to detect seal leakage prior to entry and contamination of the lower bearing and motor stator housing.