Liberty Pumps
Engineered Products

Specifications and Construction

LGV05/LGH05-Series - 60 Hz

GENERAL

The contractor shall provide labor, material, equipment, and incidentals required to provide _____ (QTY) sewage grinder pumps as specified herein. The pump models covered in this specification are LGH053A, LGH054A, LGH055A high head and LGV053A, LGV054A, LGV055A high volume grinder pumps. The pump furnished for this application shall be model _____ as manufactured by Liberty Pumps.

OPERATING CONDITIONS

Each submersible pump shall be rated at 5 hp, _____ Volts, _____ phase, 60 Hz, 3450 RPM. The unit shall produce _____ GPM at _____ feet of total dynamic head.

The submersible pump shall be capable of handling residential and commercial sewage and grinding it to a fine slurry, enabling it to be pumped over long distances. The LGH05-Series submersible pump shall have a shut-off head of 140 feet and a max flow of 120 GPM @ 20 feet of total dynamic head. The LGV05-Series submersible pump shall have a shut-off head of 97 feet and a max flow of 230 GPM @ 10 feet of total dynamic head.

CONSTRUCTION

Each centrifugal sewage grinder pump shall be equal to the Certified LGH05/LGV05-Series pumps as manufactured by Liberty Pumps, Bergen NY. The casting enclosing the motor shall be constructed of Class 30 cast iron. The motor housing shall be oil-filled to dissipate heat. Air-filled motors shall not be considered equal since they do not properly dissipate heat from the motor. Mating parts shall be machined and sealed with a Buna-N O-ring. All fasteners exposed to the process fluid shall be stainless steel. The motor shall be protected on the top side with a sealed cast iron cord entry plate, which is potted to prevent water from entering through the cord. The motor shall be protected on the lower side with a dual mechanical seal arrangement and an oil-filled intermediate chamber. The upper (inner) seal shall be a two-piece mechanical seal with a carbon rotating and a ceramic stationary face. The lower (outer) seal shall be a two-piece mechanical seal with a silicon carbide rotating and a graphite impregnated silicon carbide stationary face. The upper and lower bearings shall be sized to properly withstand radial and thrust loads produced throughout the full operating range of the pump.

POWER AND CONTROL CORD

The submersible pump shall be supplied with 35, 50, or 100 feet of a multi-conductor cord of type W for models LGH052A and LGV052A, and type SOOW for models LGH053A, LGH054A, LGH055A, LGV053A, LGV054A, and LGV055A. These type W & SOOW power cords carry a voltage rating of 600 V, a temperature rating of 90°C, have oil-resistant insulation, are water- and weather-resistant, UL listed, and CSA approved.

The power cord shall be sized for the rated full load amps of the pump for continuous duty in accordance with the NEC. A separate type SOOW control cord of equal length shall also exit the pump. Both the Standard Quick-connect power and control cords shall have a molded Neoprene plug held in place with a stainless steel compression plate. The plugs engage a receptacle with molded-in electrical pins, all of which shall be protected by a cast iron housing. The motor shall be protected from moisture via these two sealing methods: the plug to receptacle, and receptacle to cast iron housing. The power and control cord leads shall be connected to the motor leads via a terminal block. The Standard Quick-connect cords offer quick cord replacement without the need to send the entire pump to an authorized repair facility and allows for pump maintenance without disturbing electrical boxes or control panels.

HEAVY-DUTY QUICK-CONNECT CORDS

(OPTIONAL)

Optional Heavy-duty Quick-connect cord shall offer quick cord replacement without the need to send the entire pump to an authorized repair facility. This shall also allow for pump maintenance without disturbing electrical boxes or control panels. A terminal block shall be used for internal wire connections.

BEARINGS AND SHAFT

The shaft shall be supported by two ball bearings. The top bearing shall be a deep groove radial contact ball bearing and the lower bearing shall be a double row angular contact ball bearing designed to handle the radial and axial forces incurred by pumping. The lower bearing shall be positively retained by a threaded bearing retaining nut, which eliminates any axial movement or rotation of the outer bearing race. Both bearings shall be permanently lubricated by the oil that fills the motor housing. Pump designs requiring scheduled bearing maintenance shall not be considered equal. Pumps with single row lower bearings or sleeve bearings shall not be considered equal. The bearing system shall be sized to provide a minimum of 100,000 hours B10 bearing life throughout the operating range of the pump. Pumps that only provide a 50,000 hour B10 bearing life shall not be considered equal.

The motor shaft shall be made of 416 stainless steel. The motor shaft shall be constructed from a single piece of stainless steel. Spin welded shafts shall not be considered equal. The shaft shall be designed to withstand the maximum torque and radial loads present during start-up and normal operation. Shafts of carbon steel or chrome-plated shafts shall not be considered equal.

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MOTOR

The motor shall be oil-filled, inverter duty, Class H insulated, NEMA A design (3-phase models), and rated for continuous duty. Since air-filled motors are not capable of dissipating heat efficiently, they shall not be considered equal. The mid chamber design utilizing **MidTherm™ Cooling** technology shall allow for oil in the motor chamber to reject heat to the pumped media and provide cooling to the motor. This motor design shall provide significantly reduced operating temperatures. Pumps requiring an auxiliary cooling means shall not be considered equal.

The motor shall be constructed to meet IE3 Premium Efficiency standards in accordance with NEMA MG1. The copper stator windings shall be insulated with moisture-resistant Class H insulation materials, rated for 180°C per NEMA MG1 1.66. The maximum continuous temperature of pumped liquids shall be 40°C. The winding operating temperature at rated horsepower and service factor shall be a maximum of 125°C @ 40°C ambient.

Motor shall have UL approved thermostats mounted directly on the stator windings. Motor shall have two thermostats on the LGH052A and LGV052A models, and three thermostats, one on each phase, on models LGH053A, LGH054A, LGH055A, LGV053A, LGV054A, and LGV055A. The thermostat leads of the control cord shall be connected to a motor control relay in the control panel.

Motor service factor shall be 1.0 under normal conditions and 1.0 when operated on a Variable Frequency Drive (VFD) per MG1 standard. Motor shall have a voltage tolerance of ±10% from nominal. Motor shall meet the requirements of NEMA MG1 Part 30 and 31 for operation on Pulse Width Modulation type VFD with inverter duty rated magnet wire and insulation. Motor shall be capable of handling up to 30 evenly spaced starts per hour without overheating.

SEALS

The pump shall have two shaft seals separated by an oil chamber. Pumps utilizing single seal technology shall not be considered equal. A leak detection probe shall be positioned in the oil chamber and shall allow for continuous monitoring for lower (outer) seal failure. The lower seal shall be a two-piece design that is easily serviceable. Shaft seals shall not require scheduled maintenance. The upper (inner) seal shall be carbon on ceramic and the lower seal shall be silicon carbide on graphite impregnated silicon carbide. Both seals shall include stainless steel housings and Viton elastomers.

IMPELLER

The impeller shall be stainless steel. The impeller shall be dynamically balanced, keyed and bolted onto the motor shaft.

PRESSURE SEWER APPLICATIONS

A redundant check valve assembly consisting of a curb stop and check valve must be installed between the pump discharge and the street main, as close to the public right-of-way as possible, on all pressure (force main) sewer installations to protect from system pressures. The curb stop valve is necessary to isolate the site from the pressure sewer while the check valve provides redundant protection against potentially detrimental backflow. All valves and fittings should be rated for at least 200 PSI service. See Liberty Pumps line of CSV-Series Curb Stop/Swing Check Valve Assemblies and CK-Series Connection Kit.

CONTROL PANEL

All LGH05/LGV05-Series pumps require a control panel. The control panel shall be equipped with circuit breakers and adjustable overload devices to protect against excess current or electrical problems. This device shall be sized appropriately for the pump model(s) being controlled.

The control panel shall include thermal overload relay(s) that shall shut down the pump in the event the thermostats in the motor open. Thermostats are designed to open at 125°C.

The control panel shall include a seal fail monitoring device that shall indicate a primary seal failure. The seal fail monitoring device shall be capable of monitoring the resistance of the seal failure probe in the pump. The sensitivity of the seal fail monitoring device shall be adjustable from approximately 1KΩ to at least 250kΩ.

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The control panel for 1-phase models shall include a motor start circuit that automatically engages and disengages the start windings of the 1-phase motor. The motor start circuit shall consist of a properly sized relay which engages and disengages the motor start windings. A solid state start switch shall monitor start winding voltage and shall control the aforementioned relay. The start and run capacitors shall be properly sized per the motor specifications. A bleed resistor shall be used on the start capacitor to avoid unwanted voltage spikes during startup. Capacitor start/run components (Kit#K001864) are available for 1-phase models using a non-Liberty Pumps control panel.

Pump Model	Voltage	Control Panel Model			
		Fiberglass Enclosure		Stainless Steel Enclosure	
		Duplex	Simplex	Duplex	Simplex
LGH052A	230	LED2-50A	LES2-50A	LEDS2-50A	LESS2-50A
LGV052A	230	LED2-50A	LES2-50A	LEDS2-50A	LESS2-50A
LGH053A	200/230	LED3-35	LES3-35	LEDS3-35	LESS3-35
LGV053A	200/230	LED3-35	LES3-35	LEDS3-35	LESS3-35
LGH054A	460	LED3-35	LES3-35	LEDS3-35	LESS3-35
LGV054A	460	LED3-35	LES3-35	LEDS3-35	LESS3-35
LGH055A	575	LED5-20	LES5-20	LEDS5-20	LESS5-20
LGV055A	575	LED5-20	LES5-20	LEDS5-20	LESS5-20

CUTTER MECHANISM

The cutter and plate shall consist of hardened 440 stainless steel with a Rockwell C hardness of 55-60. The stationary cutter plate shall have specially designed orifices through it, which enable the slurry to flow through the pump housing at an equalized pressure and velocity. The stationary cutter plate shall feature V-Slice® Cutter Technology. This superior cutting system consists of V shapes to maximize cutting action and exclusion slots to outwardly eject debris from under the rotary cutter. The rotary cutter shall have four blades and be designed with a recessed area behind the cutting edge to reduce the accumulation and binding of any material between the rotary cutter and the stationary cutter plate. The cutter shall be capable of over 400,000 cuts per minute. The cutting system shall incorporate close tolerances for optimum performance. Ring or radial cutters, or those that grind on the outside circumference shall not be considered equal.

SHAFT GROUNDING BRUSH

3-phase pumps shall be equipped with a shaft grounding brush. Pumps not utilizing a current mitigation technology shall not be considered equal.

QUALITY CONTROL

The pump shall be manufactured in an ISO® 9001 certified facility. Manufactured in the USA with US and global components.

SUPPORT

The pump shall have cast iron support legs, enabling it to be a freestanding unit. The legs shall be high enough to allow solids and long stringy debris to enter the pump inlet.

PROTECTIVE FINISH

The exterior of the casting shall be protected with corrosion-resistant baked-on powder coat.

TESTING

The pump shall have a ground continuity check and undergo a hi-pot test for electrical integrity, moisture content, and insulation defects. The motor housing and mid chamber shall be pressurized, and an air leak decay test performed to ensure integrity of the assembled unit. The pump shall be run at rated voltage to verify current, performance curve and monitor operation. Certified performance testing is available upon request.

APPLICATIONS

- Municipal Engineered Lift Stations
- Storm Water Removal
- Wastewater Transfer
- Industrial Wastewater
- Treatment Plants

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MATERIAL FEATURES
PUMP:

- Grinder - High Head or High Volume
- Discharge - Horizontal, 2", 2.5" & 3" 150# ANSI, with 2" NPT, Vertical, 2" or 3" NPT
- Seals - Dual Mechanical with Viton Elastomers, Upper (Inner) - Carbon on Ceramic; Lower (Outer) - Silicon Carbide on Graphite Impregnated Silicon Carbide
- Construction - Cast Iron ASTM A48, Class 30, 30,000# Tensile Strength, Protected with a Corrosion-Resistant Baked-on Powder Coating
- Hardware - 316 Stainless Steel
- O-ring Seals - Buna-N
- Stainless Steel Impeller - Precision Balanced
- Hardened 440 Stainless Steel Cutter and Cutter Plate
- Cuts Per Minute - over 400,000
- Thermal Sensors and Moisture Detection System
- Optional:
  - Heavy-duty Quick-connect Power and Control Cords
  - Cord Length Options (feet) - 35, 50, 100
  - Trimmed Impeller

MOTOR:

- 1-Phase - 230V, 3450 RPM
- 3-Phase - 200/230, 460, 575V, 3450 RPM
- Inverter Duty, Class H Insulation, NEMA A Design (3-phase models)
- Oil-filled Motor Housing
- Cast Iron Housing with **MidTherm™ Cooling** Deep Sump Design for Improved Heat Dissipation
- Continuous Duty Operation
- Bearings
  - Upper - Single Row Deep Groove Radial Contact
  - Lower - Double Row Angular Contact

LIMITED WARRANTY

Liberty Pumps, Inc. warrants that pumps of its Engineered Product line are free from all factory defects in material and workmanship for a period of 18 months from the date of installation or 24 months from the date of manufacture, whichever occurs first, and provided that such products are used in compliance with their intended applications as set forth in the Liberty Engineered Products specifications and technical manuals. The date of installation shall be determined by a completed pump start-up report and warranty registration form.

A pump startup report, filled out by a qualified installer, is required for warranty to take effect. The report must be submitted within 30 days from the installation date and submitted through the Liberty Pumps website. During the warranty period, the manufacturer's obligation, and at its discretion, shall be limited to the repair or replacement of any parts found by the manufacturer to be defective, provided the product is returned freight prepaid to the manufacturer or its authorized service center, and provided that none of the following warranty-voiding characteristics are evident:

The manufacturer shall not be liable under this Warranty if the product has not been properly installed or maintained in accordance with the printed instructions provided; if it has been disassembled, modified, abused or tampered with; if the pump discharge has been reduced in size; if the pump has been used in water temperatures above those shown in the specifications; if the thermal overload(s) and seal moisture probe(s) have not been properly connected (where equipped); if the pump has been used in water containing sand, lime, cement, gravel or other abrasives; if the product has been used to pump chemicals or hydrocarbons; if the product has been moved from its original installation location, or if the label bearing the serial and code number has been removed.

Liberty Pumps, Inc. shall not be liable for any loss, damage or expenses resulting from installation or use of its products, or for consequential damages, including field labor costs, travel expenses, rental equipment, costs of removal, reinstallation or transportation to and from the factory or an authorized Liberty Pumps repair facility.

There is no other express warranty. All implied warranties, including those of merchantability and fitness for a particular purpose, are limited to 18 months from the date of installation or 24 months from the manufacturing date. This Warranty contains the exclusive remedy of the purchaser, and, where permitted, liability for consequential or incidental damages under any and all warranties are excluded.

Specifications are subject to change without notice.

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7000 Apple Tree Avenue - Bergen, NY 14416
Phone 800-543-2550 - Fax 585-494-1839 - www.LibertyPumps.com/LEP