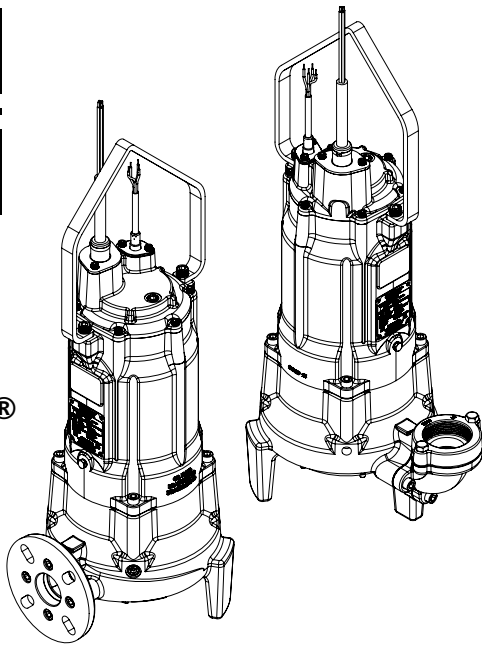
Liberty Pumps®

A Family and Employee Owned Company

Omnivore® Grinders

Pump **Specification**

commercial**series**



LSGV500-Series

5 hp Grinder Pumps

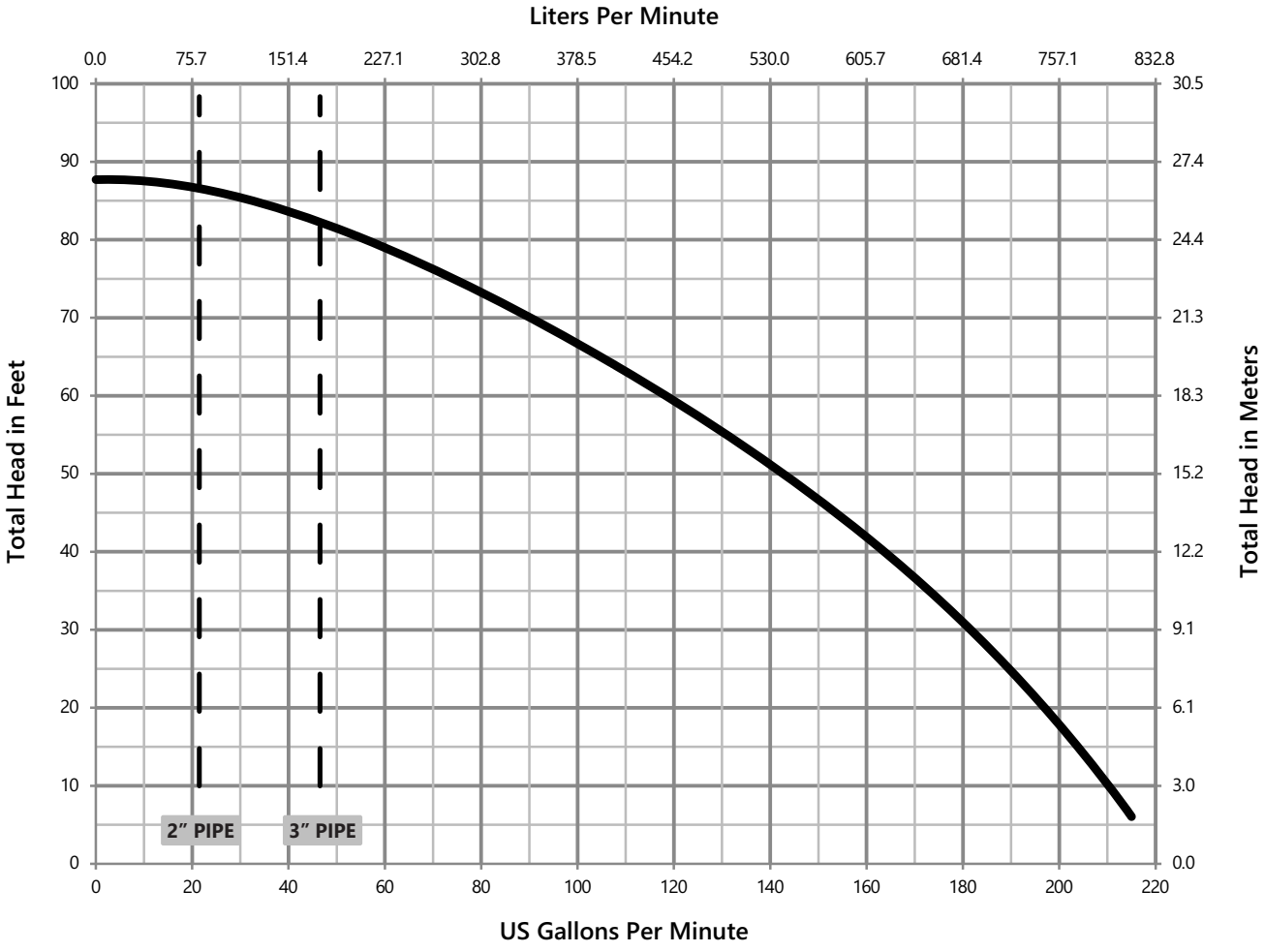
Horizontal Discharge, 2", 2.5" & 3" ANSI®

(DIN 50-PN10, DIN 65-PN10, DIN 80-PN6, RESPECTIVELY)

with 2" NPT

-or-

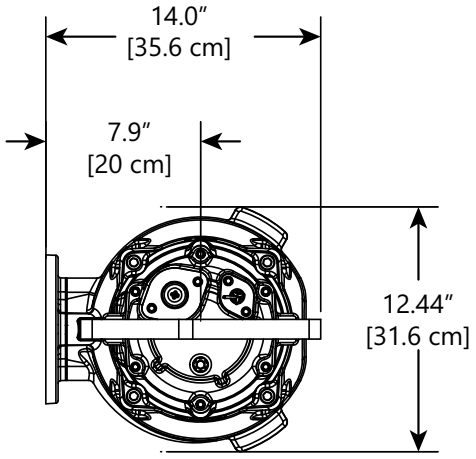
Vertical Discharge, 2"/3" NPT

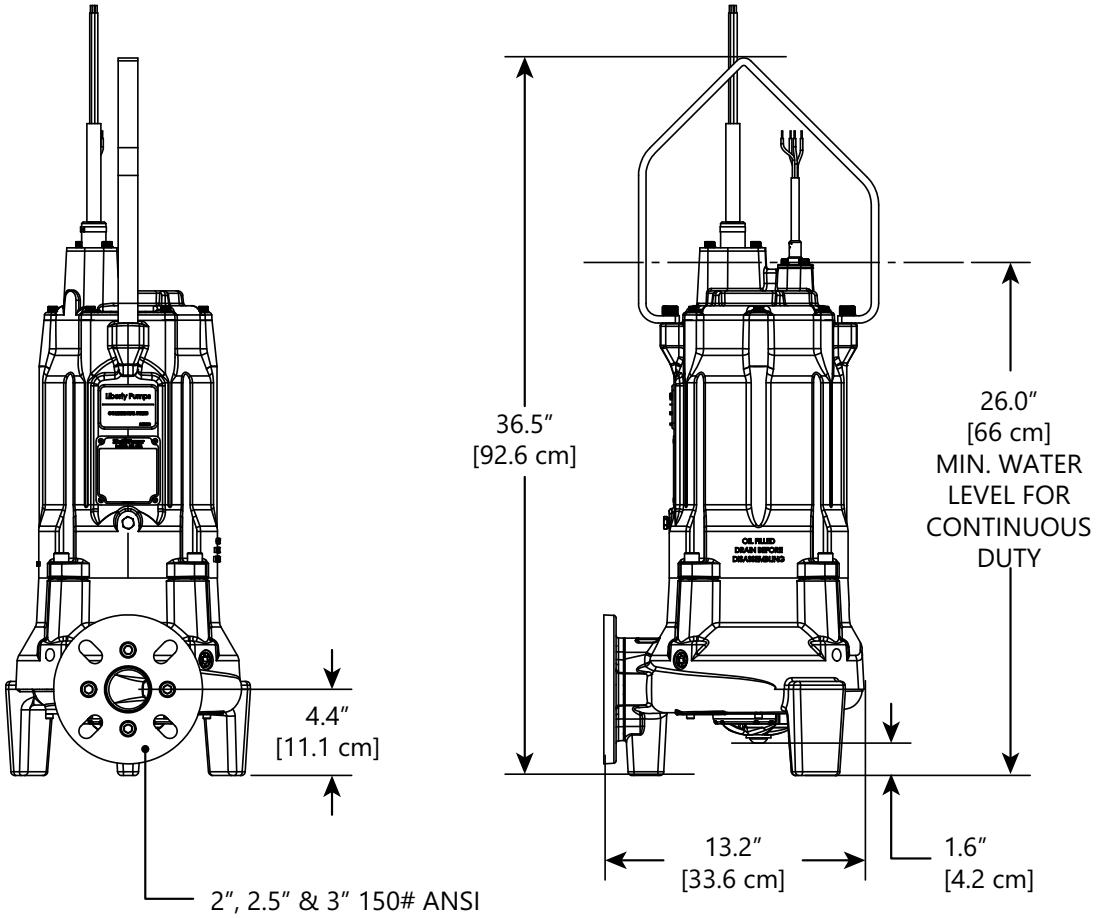


7000 Apple Tree Avenue Bergen NY 14416 ■ ***Phone*** *1-800-543-2550* ■ ***Fax*** *1-585-494-1839* ■ ***Email*** *Liberty@LibertyPumps.com* ■ ***Web*** *www.LibertyPumps.com*

Horizontal Discharge

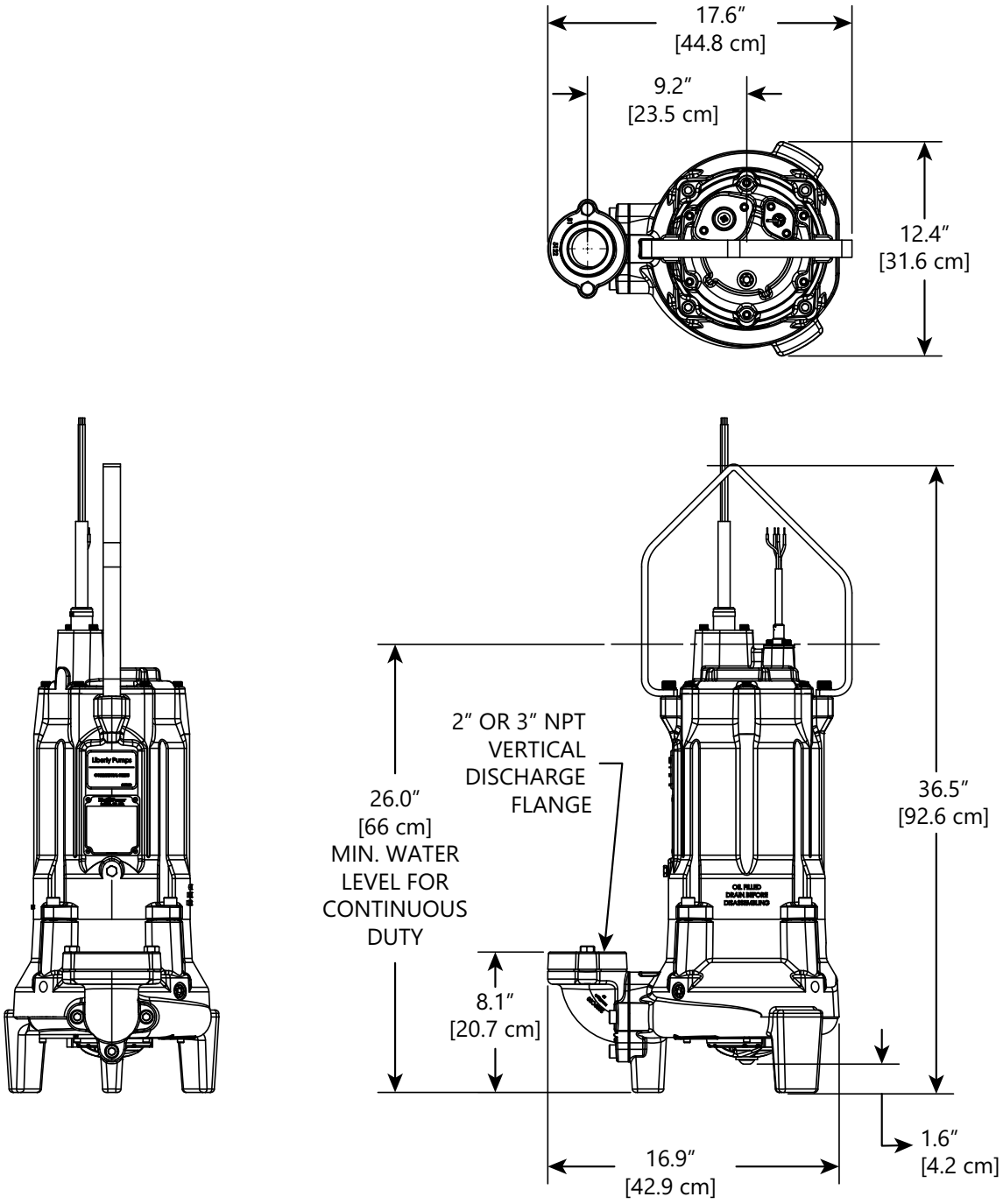
OPTIONAL DISCHARGE KIT
AVAILABLE FOR 4″ ANSI
DISCHARGE
KIT #K002016





*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*

Vertical Discharge



*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*

LSGV500-Series Electrical Data

	MODEL[1]	HP	VOLTAGE	PHASE	FULL LOAD AMPS	LOCKED ROTOR AMPS	MAX KW INPUT	SERVICE FACTOR	POWER FACTOR	KVA CODE	CORD LENGTH
HORIZONTAL DISCHARGE	LSGV502M-3	5	230	1[2]	26	154	5.9	1	0.99	H	35 FT
	LSGV502M-5	5	230	1[2]	26	154	5.9	1	0.99	H	50 FT
	LSGV503M-3	5	200/230[3]	3	17.5/16.5	120	5.7	1	0.89	L	35 FT
	LSGV503M-5	5	200/230[3]	3	17.5/16.5	120	5.7	1	0.89	L	50 FT
	LSGV504M-3	5	460	3	8	60	5.7	1	0.84	L	35 FT
	LSGV504M-5	5	460	3	8	60	5.7	1	0.84	L	50 FT
	LSGV505M-3	5	575	3	6.2	48	5.4	1	0.83	L	35 FT
	LSGV505M-5	5	575	3	6.2	48	5.4	1	0.83	L	50 FT
VERTICAL DISCHARGE	LSGV502MV-3	5	230	1[2]	26	154	5.9	1	0.99	H	35 FT
	LSGV502MV-5	5	230	1[2]	26	154	5.9	1	0.99	H	50 FT
	LSGV503MV-3	5	200/230[3]	3	17.5/16.5	120	5.7	1	0.89	L	35 FT
	LSGV503MV-5	5	200/230[3]	3	17.5/16.5	120	5.7	1	0.89	L	50 FT
	LSGV504MV-3	5	460	3	8	60	5.7	1	0.84	L	35 FT
	LSGV504MV-5	5	460	3	8	60	5.7	1	0.84	L	50 FT
	LSGV505MV-3	5	575	3	6.2	48	5.4	1	0.83	L	35 FT
	LSGV505MV-5	5	575	3	6.2	48	5.4	1	0.83	L	50 FT

1. For 3-phase models operated on a variable frequency drive, VFD should be rated for a minimum of 1.5 times pump nameplate FLA.
2. Single-phase motors require capacitors and start switch. Liberty Pumps control panel or motor start circuit kits are recommended for proper operation and warranty. See ***Control Panel Information***.
3. System voltages: 208 and 240 volts with utilization voltages: 200 and 230 volts.

LSGV500-Series Control Panel Information

PUMP MODEL	VOLTAGE	3 FLOAT SIMPLEX	3 FLOAT DUPLEX	4 FLOAT DUPLEX
LSGV502	230	SXSKC24=3	AES24KC=3	AES24KC=4
LSGV503	200/230	SXS34=3-621	AES34=3-621	AES34=4-621
LSGV504	460	SXS34=3-191	AES34=3-191	AES34=4-191
LSGV505	575	SXS54=3-405	AES54=3-405	AES54=4-405

*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*

LSGV500-Series Technical Data

MOTOR INSULATION CLASS	CLASS F 155°C / 311°F
IMPELLER TYPE / MATERIAL	SEMI-OPEN / STAINLESS STEEL
SHUT-OFF HEAD	88 FT
MIN HEAD	5 FT
MAX FLOW @ MIN HEAD	215 GPM
QUICK-CONNECT CORD	STANDARD
POWER CORD TYPE 1-PHASE	TYPE W
POWER CORD TYPE 3-PHASE	SOOW
UPPER (INNER) SEAL MATERIAL	CARBON - ROTATING, CERAMIC - STATIONARY, VITON ELASTOMERS
LOWER (OUTER) SEAL MATERIAL	SILICON CARBIDE - ROTATING, GRAPHITE IMPREGNATED SILICON CARBIDE - STATIONARY, VITON ELASTOMERS
MAX WATER TEMP FOR CONTINUOUS DUTY	40°C / 104°F
MIN FLUID LEVEL FOR CONTINUOUS OPERATION	MOTOR HOUSING FULLY SUBMERGED
FLUID pH RANGE	4–10
STARTS PER HOUR	30
SHAFT MATERIAL	416 STAINLESS STEEL
FASTENER MATERIAL	316 STAINLESS STEEL
O-RING ELASTOMERS	BUNA-N
UPPER BEARING	SINGLE ROW DEEP GROOVE
LOWER BEARING	DOUBLE ROW ANGULAR CONTACT
OIL TYPE	ISO VG 10 TURBINE OIL
HORIZONTAL DISCHARGE	2", 2.5" & 3" 150# ANSI (DIN 50-PN10, DIN 65-PN10, DIN 80-PN6, RESPECTIVELY) WITH 2" NPT
VERTICAL DISCHARGE	2" & 3" NPT
PROTECTIVE EXTERNAL FINISH	POWDER COAT
SEAL FAIL DETECTION	DUAL PROBE - 2 WIRE WITH RESISTOR, 200K Ω RESISTANCE
THERMAL PROTECTION	HERMETICALLY SEALED THERMOSTATS, 125°C OPENING TEMPERATURE, 105°C CLOSING TEMPERATURE, 3A @ 120 VAC, 1A @ 240 VAC
VOLUTE MATERIAL	CLASS 30 CAST IRON
APPROX WEIGHT	127 KG / 280 LBS
CUTS PER MINUTE	OVER 400,000
CERTIFICATIONS	CSA CERTIFIED TO CSA AND UL® STANDARDS, CAN/CSA C22.2 NO. 108, ANSI/UL 778

*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*

1.01 GENERAL

The contractor shall provide labor, material, equipment, and incidentals required to provide _____ (QTY) sewage grinder pumps as specified herein. The **COMMERCIAL SERIES** pump models covered in this specification are 1-phase model LSGV502, and 3-phase models LSGV503, LSGV504, and LSGV505 high volume grinders pumps. The pump furnished for this application shall be model _____ as manufactured by Liberty Pumps.

2.01 OPERATING CONDITIONS

Each LSGV500-Series 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 LSGV500-Series submersible pump shall have a shut-off head of 88 feet and a max flow of 215 GPM @ 5 feet of total dynamic head. The maximum submersion depth is 75 feet.

3.01 CONSTRUCTION

Each centrifugal sewage grinder pump shall be equal to the C SP US Certified LSGV500-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. 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.

4.01 POWER AND CONTROL CORD

The submersible pump shall be supplied with 35 or 50 feet of a multi-conductor cord. It shall be cord Type W (1-phase) and SOOW (3-phase). These power cords carry a voltage rating of at least 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 Quick-connect power and control cords shall have a molded 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 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.

5.01 MOTOR

The motor shall be oil-filled, inverter duty, Class F insulated, 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.

*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*

The copper stator windings shall be insulated with moisture-resistant Class F insulation materials, rated for 155°C. 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 1-phase LSGV502 model, and three thermostats, one on each phase, on 3-phase models LSGV503, LSGV504, and LSGV505. 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. Motor shall have a voltage tolerance of ±10% from nominal. Motor shall be capable of handling up to 30 evenly spaced starts per hour without overheating. 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. A VFD utilizing 3-phase input power shall be rated for a minimum of 1.5 times pump nameplate FLA. A VFD utilized to convert 1-phase input power to operate a 3-phase pump shall be rated a minimum of 2.0 times pump nameplate FLA.

6.01 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 extension shall be made of 416 stainless steel. The shaft shall be designed to withstand the maximum torque and radial loads present during start-up and normal operation.

7.01 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.

8.01 IMPELLER

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

9.01 CONTROL PANEL

All LSGV500-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. The LSGV500-Series was dual probe designed with a 200KΩ resistor so the circuit can be verified externally.

7000 Apple Tree Avenue Bergen NY 14416 ■ ***Phone*** *1-800-543-2550* ■ ***Fax*** *1-585-494-1839* ■ ***Email*** *Liberty@LibertyPumps.com* ■ ***Web*** *www.LibertyPumps.com*

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. A properly sized solid state motor start switch shall monitor start winding voltage and engage and disengage the start capacitor(s) from the circuit, as necessary. The start and run capacitors shall be properly sized per the motor specifications. A properly sized bleed resistor shall be used on the start capacitor(s) to avoid potentially damaging voltage spikes during startup. Capacitor start/run components and start switch (Kit #K002080) are available for 1-phase models using a non-Liberty Pumps control panel.

10.01 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 arc shape 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 prevent the accumulation and binding of any material between 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 of shall not be considered equal.

11.01 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 if operated on VFD.

12.01 QUALITY CONTROL

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

13.01 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.

14.01 PROTECTIVE FINISH

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

15.01 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 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.

16.01 WARRANTY

Liberty Pumps, Inc. warrants that pumps of its **COMMERCIAL SERIES** 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 specifications and technical manuals. The date of installation shall be determined by a completed **COMMERCIAL SERIES** pump start-up report and warranty registration form.

*7000 Apple Tree Avenue Bergen NY 14416 ■ **Phone** 1-800-543-2550 ■ **Fax** 1-585-494-1839 ■ **Email** Liberty@LibertyPumps.com ■ **Web** www.LibertyPumps.com*