



SPECIFICATION FOR A FOUR INCH, HIGH PERFORMANCE VACUUM ASSISTED, FULLY AUTOMATIC, SOUND ATTENUATED PUMPSET, MOUNTED ON A DOT TRAILER

SIZE: 4"

POWER PRIME MODEL: SiteMax 1500 49HP F4

IMPELLER DIAMETER: 11.26 INCHES

ENGINE: KUBOTA: V2403-M-E3B-KEA-2

EPA EMISSION LEVEL: INTERIM TIER 4

PRIMING SYSTEM: 16 CFM COMPRESSOR/VENTURI

SPECIFICATION No:

RELEASE SCHEDULE:

No	REVISION DETAIL	DATE	BY
1	First issue/ Draft	2/19/15	CI
2	Canopy & model designation update	3/10/15	CI

**SPECIFICATION FOR A FOUR INCH, HIGH PERFORMANCE VACUUM ASSISTED, FULLY
AUTOMATIC, SOUND ATTENUATED PUMPSET, MOUNTED ON A DOT TRAILER**

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1.0 GENERAL DESCRIPTION

Specifications detailed herein represent the minimum requirements for a new four inch, latest design, high performance, vacuum assisted, fully automatic self-priming, water-cooled diesel engine powered, sound attenuated, trailer mounted pump. The design of the pump shall be heavy duty of the type used within the construction, mining, rental and municipal markets. The pump design shall be environmentally safe with a demonstrated ability to operate continuously at accepted noise and environmental emissions limits. Additionally, the pump shall be multi-purpose suitable for wastewater and other general purpose duties. An acceptable make and model pump would be the **Power Prime Pumps model, SiteMax 1500 49HP F4**, size 4 inch and/or approved equal.

The priming system shall be an integral part of the pump design with the ability to function automatically based on demand (Whether liquid is present at the suction hose or pipe). An essential performance requirement for the specified pump is an ability to prime from a dry condition (Pump and suction system totally void of priming liquid) of 28 feet vertical suction lift.

The pump and the engine assembly shall be closed-coupled and mounted within a vandal proof, rotationally molded, sound attenuating canopy/enclosure of double-walled polyethylene construction.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

2.0 HYDRAULIC DESIGN

The hydraulic design/shape of the impeller shall combine the positive screw action of two conically shaped vanes extending into the suction front cover to achieve a low NPSHR and non-ragging characteristics. The overall width of the impeller shall not be less than 4.30 inches and shall have a demonstrated dual solids handling passage of 1.6" x 2.95" inches. The volute passage shall be of a single non-split flow path. *Recirculating type self-priming pumps incorporating internal chambers for the detainment of priming liquid are not acceptable due to inherent clogging problems associated with this design.*

Maintenance of the impeller to suction cover front clearance along the entire length shall be accomplished through removal of shims between the volute outside machined surface and the front cover. Shims shall be manufactured from a copolymer material.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

3.0 HYDRAULIC CONSTRUCTION

The pump shall be of a single stage end suction design. The suction intake shall be on the same axis as the pump shaft. The orientation of the suction and discharge ports shall be in the same direction facing rear opposite the trailer tow tongue. The discharge check valve shall be integral to the volute and incorporate a replace stainless steel seat held captive by stainless steel socket head cap screws. The volute shall incorporate a cover to allow for access and replacement of a BUNA N disc valve and stainless steel seat. The flow area of the discharge check valve shall be 100% at a maximum disc movement of 35° from the resting position.

The bearing system shall be of a heavy duty design, grease lubricated, incorporate back-to- back pair of angular contact bearings at the drive side, held captive by a single stainless steel self-locking bearing retainer for axial thrust protection, and a single cylindrical roller type bearing for radial load protection. The design shall not require shimming or other adjustments. Ingress of contaminates to the drive side bearing shall be prevented via a Viton oil seal.

The B¹ bearing life shall not be less than 100,000 hours at normal operating conditions. The impeller shall be secured to the pump shaft via a tapered fit with a rectangular drive key along the length of the taper. The impeller shall be secured to shaft via a stainless steel socket head cap screw, flat washer, and lock washer.

Shaft sealing shall be provided by tandem single face seals operating within a lubrication medium of Mobile DTE FM 32 hydraulic biodegradable oil. The sealing faces shall be silicon carbide x silicon carbide with Viton sealing elastomers, and 316 stainless steel spring and other capture components. The seal shall be capable of operating dry for extended periods without harm. The seal lubrication reservoir shall be, located above the seal chamber, clearly visible, and made of a damage resistant HDPE. The reservoir mounting bracket shall be directly secured to the check valve cover and designed with a hand hole to facilitate removal of the inspection cover.

3.1 MATERIALS OF CONSTRUCTION

Pump shall meet or exceed the following materials of construction:

- 3.1.1 Suction Intake: Ductile Iron ASTM A395-76, Grade 60-40-18.
- 3.1.2 Volute: ASTM A48 Class 35.
- 3.1.3 Impeller: Austempered Ductile Iron (ADI) ASTM A897 (150-11-07)
Heat treated to a minimum hardness of, 341 BHN.

- 3.1.4 Cover: Austempered Ductile Iron (ADI) ASTM A897 (150-11-07).
Heat treated to a minimum hardness of BHN.
- 3.1.5 Rear Wear Cover Plate: Cast Stainless Steel: ASTM A743 (CA40).
- 3.1.6 Shaft: Stainless Steel 17-4, ASTM A564, Grade 630.
- 3.1.7 Bearing Housing: Ductile Iron ASTM A395-76, Grade 65-45-12.
- 3.1.8 Check Valve Seat: ANSI Stainless Steel ANSI 316.
- 3.1.9 Elastomers and Gaskets: Viton.

Bidder's Response. Meets or exceeds specifications Yes No

If no, explain _____

4.0 PERFORMANCE CHARACTERISTICS

The pump shall exhibit a steep head/quantity curve to meet the varied uses. The **minimum** total head shall be 200 feet (Maximum shut-off head) and should not be less than 13.0 times the end of curve full flow condition head of 1500 US GPM @ 30 feet TDH when using 6 inch suction and discharge hoses. The pump **maximum** working pressure shall not be less than 145psi.

The pump performance shall not be less than the following:

- 4.1 At a static suction lift of 20 feet: 700 GPM. This should represent a deterioration of no more than 53% of the **maximum** capacity i.e., 1500 GPM when operated on 6"x 40' suction hose.
- 4.2 At a static suction lift of 28 feet: 400 GPM when operated on 6" x 40' suction hose. This should represent a deterioration of no more than 73% of the **maximum** capacity i.e., 1500 GPM.
- 4.3 The nominal operating conditions shall condition shall not be less than:
 - 4.3.1 700 GPM at a total head of 130 feet. The **maximum** power absorbed should not be greater than 37.0 BHP. This capacity shall be available at a 20 feet **minimum** static suction lift when operated on 6" x 40' suction hose.
 - 4.3.2 400 GPM at a total head of 160 feet. The **maximum** power absorbed should not be greater than 37.0 BHP. This capacity shall be available at a 28 feet **minimum** static suction lift when operated on 6" x 40' suction hose.
- 4.4 The pump should be capable of operating over the full range of its performance curve without any restriction or damage to any component.

Bidder's Response. Meets or exceeds specifications Yes No

If no, explain _____

5.0 PRIMING SYTEM

The pump shall be fitted with a *Clean Prime* or equivalent equal, fully-automatic priming system incorporating a centrifugal pump shaft driven 16 cubic feet per minute (Minimum) displacement air compressor.

The compressor shall be mounted on an adjustable bracket, without the use of shims for belt tensioning. The adjustable compressor mounting bracket shall attach directly to the centrifugal pump bearing housing. The drive system shall incorporate a non-slip belt system incorporating a single Gates GT2 continuous poly chain. The drive system shall be guarded to meet EU compliance standards and BS EN 13857.

The compressor shall be directly oil lubricated and water cooled from the engine. This direct lubrication and cooling of the compressor shall be approved by the engine manufacturer.

The air ejector assembly shall be located above the pump suction, mounted to a cast iron separation tank. The air ejector assembly shall operate on the pressure side of the compressor, thus eliminating the possibility of water being drawn into the air source. Priming control shall be via a float actuated compound lever mechanism to control the removal of air from the pump suction system and to prevent the discharge of pumped liquid to atmosphere.

The priming system shall be capable of repeatedly priming the pump from a completely dry/void of any priming liquid condition. The pump must be capable of running dry for indefinite periods and then be capable re-priming and returning to normal pumping volumes. The priming system shall be rated to operate at positive suction inlet conditions equal to the maximum discharge pressure capability of the centrifugal pump. Operation from negative to positive inlet suction conditions must be fully automatic and not require the closure of valves or other manual adjustments. The air ejector assembly shall incorporate a ball type non-return valve to prevent the loss of suction liquid during repeated priming cycles and shutdown. The priming system shall incorporate the following materials of construction:

5.1 MATERIALS OF CONSTRUCTION

Pump shall meet or exceed the following materials of construction:

- 5.1.1 Suction Tank: Cast Iron, ASTM A48 Class 35.
- 5.1.2 Adjustable Compressor Bracket: Ductile Iron, ASTM A536-84/65-45-12.
- 5.1.3 Ejector Assembly: Stainless Steel UNS31600.
- 5.1.4 Top Cover: Cast Iron, ASTM A48 Class 30.
- 5.1.5 Compound Float Mechanism: Stainless steel UNS31600.

- 5.1.6 Pins, Compound Float Mechanism: Stainless steel UNS31600.
- 5.1.7 Mounting Plates, Top Cover & Float Mechanism: Steel, ASTM A36.
- 5.1.8 Seat, Orifice: Stainless Steel UNS 30300
- 5.1.9 Button, Orifice Seal: Viton.
- 5.1.10 Internal Non-Valve Seat/Ball: Brass, ASTM B16, C36000/Neoprene
- 5.1.11 Elastomers and Gaskets: Viton.
- 5.1.12 Air Supply Hose: Smooth bore Teflon tube with 300 series stainless steel over-braiding. Hose assembly shall be covered with a protective fire sleeve or jacket to insulate and prevent chaffing.

A pneumatic schematic drawing shall accompany your bid submission showing compliance with this section.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

6.0 TRAILER/CONTAINMENT

The pump and engine shall be close-coupled and mounted on four mobile type anti-vibration mounts on an engine/pump chassis sub-frame. The aforementioned assembly shall be mounted within a containment system of sufficient proportions to retain 167% of the total fuel capacity. The complete integrated assembly shall be manufactured to the following standard:

- 6.1 The complete assembly shall be certified by an Independent Professional Engineer (Structural). A copy of this certification shall accompany your bid submission showing compliance.
- 6.2 The trailer manufacturer shall be an audited member of the, National Trailer Manufacturers Association. The trailer shall be affixed with the appropriate safety warning labels.
- 6.3 The center lifting bracket shall be attached to the chassis sub-frame and include a lift eye with a minimum slot opening of 3.0 x 2.0 inches. The connections shall be of a grade 8 or equivalent bolted design to allow for replacement if this safety related component is damaged. The lifting eye shall be directly accessible above the top canopy surface when closed without the removal or opening of any access doors or covers.
- 6.4 For corrosion resistance, and lower maintenance, the fuel cell shall be rotationally molded in cross-linked high density polyethylene, Ingenia Superlink 110 or approved material equal. The fuel cell wall thickness shall be not less than 0.37 inches. The capacity shall not be less than 88.5 gallons sufficient to operate the

pump continuously for 43 hours under full load operating conditions. The fuel cell shall include the following accessories:

6.4.1 Mechanical fuel level gauge.

6.4.2 Fuel level sending device of stainless steel construction for indication at control panel.

6.4.3 Extended fuel filler neck with gasketed truncated threaded cap with permanently molded-in words, "Diesel Fuel". The top surface of the fuel cell shall be recessed to allow spilled fuel to be directed to the containment system.

6.4.4 Two drain plugs for draining and cleaning.

6.5 The containment shall include the following accessories:

6.5.1 Two quick release drain plugs secured to prevent loss by cable lanyards. The drain plug positions shall align with the fuel cell drain plug positions.

6.5.2 Bulkhead type fittings to allow for the external drainage of the following fluids, engine coolant, engine lubricating oil, and pump shaft seal.

6.6 The trailer running gear shall comprise of four removable assemblies, front tow tongue, axle with electric brakes, fenders and rear bumper assembly. Assemblies shall be attached via a grade 8 bolting system to allow for conversion to base or skid mount configuration if desired. The trailer shall be equipped with LED trailer lights and reflectors to ICC and DOT regulations. All wiring shall be protected. Wiring splices shall be made via Butt type insulated solder type connectors for long term durability and corrosion protection.

6.7 The rear bumper assembly shall include two drop leg style hand cranking style jacks each of 2,500 lbs. capacity. The front tow tongue assembly shall include one retractable wheel jack of 1,500 lbs. rating. All jacks shall be of a bolt-on design.

6.8 Other trailer accessories shall include safety chains and plug connector for lights and brakes.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

7.0 SOUND ATTENUATING CANOPY

The sound attenuating canopy shall consist of four sections. Three main double walled sections: Fixed rear air inlet louver section with the external and internal walls offset to aid in sound attenuation, center pivot section for easy access, and fixed front air

outlet section. Each of the aforementioned sections shall be rotationally molded in high density polyethylene, Hexane Copolymer, Marlex TR-942/HMN-942G and/or approved equal.

For ease of maintenance and engine radiator cleaning, cooling air discharge shall be through a removable molded louver manufactured from Acrylic Weather Resistant Kydex 510 material, or approved equal, secured to the front canopy section via ten socket head cap screws.

The canopy design shall be vandal and damage resistant with specified imbedded color for a no maintenance finish and long term durability. For access to the pump and engine assembly for maintenance, the single center canopy section shall open/rotate up from a pivot point located about the engine cooling radiator position on the front of the trailer. Access for maintenance shall *only* be accomplished via the opening of this center cover. *Enclosures with multiple doors are deemed non acceptable due to the limited access.* The center canopy shall rotate about its pivot point located 4.1 inches above the top of the containment surface located within the front canopy section. The center canopy shall open with the assistance of two seal-less, gas-less and oil-less mechanical spring struts. *Gas springs are deemed not acceptable in this application due to the eventual weakness of this component in the long term operation.* The center canopy handle force, located at the front of the pump set, shall be 5.0 lbs. (Closed) and 20.0 lbs. (Open). The driver's side mechanical strut shall include an automatic locking safety device to prevent accidental closing under inclement weather conditions. Manual release of this safety device shall allow the center canopy to close. The center canopy shall be supported by a reinforced/connected by a clear zinc plated ANSI 1018 steel fabricated bracket via a 1.0 inch diameter pivot pin to a clear zinc plated ANSI 1018 steel base bracket secured to the top containment surface. Mechanical strut forces shall only be subjected to the aforementioned steel bracket structures. The canopy structure shall have a minimum wind load rating of 150 MPH center canopy closed, and 40 MPH with the center canopy open. In the closed position the center canopy section shall be secure by two sound and vibration dampening rubber latches. A single style padlock locking device shall be used to secure the sound attenuating canopy during unattended operation. Storage for Operation and Maintenance Manual shall be provided inside the canopy.

To allow for future emission levels to be met, and future upgrading, the enclosure shall be designed to accept EPA tier 4 engines of the same Kubota model designation.

The pump set is intended for use in residential areas day and night, for this purpose the *maximum* acceptable sound pressure level (SPL) shall not to exceed 70 dB (A) @ 23 feet, operating at 1800 rpm. Pump set shall be tested in accordance with ISO 3744 (2010) Acoustics- Determination of sound power levels of noise sources using sound pressure-Engineering method in an essentially free field over a reflecting plane. Factory Certification / Test data will be required to show compliance with this requirement (*Unsubstantiated or non- traceable data will not be accepted for evaluation purposes*). It is required that your proposal include the standard

production model noise test for the actual product being offered in accordance with ISO 3744 (2010), the noise test shall include, but not limited to, the following data:

Dimensions of equipment – Noise envelope.

Operational Speed.

Instrumentation and calibration equipment used during referenced test.

Measuring microphone array positions (Minimum of 5)

Noise Levels in dB covering the following Octave Band Center Frequency Ranges (Hertz): 32, 63, 125, 250, 500, 1K, 2K, 4K, 8K, and 16K

SPL results shall be presented in dB (A) at a distance of 3.28 feet plus the Sound Power Level (SWL) at this distance. The SPL shall also be presented graphically, dB (A) versus distances of up to 328 feet; this information is required to enable operations Personnel to apply the equipment in residential areas with known results for varying conditions.

Failure to supply this information will result in your bid being considered non-responsive.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

8.0ENGINE

The engine shall be an EPA interim tier 4, four cylinder, water cooled diesel, naturally aspirated, Kubota model V2403-M-E3B-KEA-2 or approved equal with the following characteristics:

8.1Bore: 3.43 inches.

8.2Stroke: 4.03 inches.

8.3 Maximum displacement: 148.5 cubic inches.

8.4 Maximum power rating: 49 BHP (Gross)

8.5 The engine shall be equipped with the following:

8.5.1 Battery and cables.

8.5.2 Fuel/water separator, Racor model 445R10 or approved equal.

8.5.3 Micro-disc type critical attenuating silencer.

8.5.4 Removable exhaust insulation from and including the engine exhaust manifold to the to the exit point from the canopy. Insulation is required for operator protection and shall meet the following minimum material requirements:

8.5.4.1 High temperature thermal blankets consisting of a woven stainless mesh liner, type E fiberglass insulation (to MIL Spec. MIL-16411E) and a cold face of flexible silicon impregnated fiberglass cloth. The blanket edges shall be machined stitched with high-grade fiberglass thread

and secured in place with stainless steel springs and or wires. The exhaust external discharge shall be oriented in such a manner.

- 8.6 The exhaust shall exit through the top of the center sound attenuating canopy and shall terminate in a 90° bend to prevent the ingress of rain without the use of a rain cap for quietest operation.
- 8.7 Power from the engine shall be transmitted to the pump shaft via an elastomeric coupling. The coupling manufacturer shall provide torsional analysis calculations establishing suitability of the coupling based on the pump and engine mass elastic data. To allow for the eventual replacement of vacuum pump drive belts the geared driver coupling shaft hub shall be of a split diameter design to facilitate replacements of aforementioned belts without disconnection of the pump from the engine.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

9.0 ENGINE CONTROL PANEL (Auto-Start)

Pump shall be equipped with a microprocessor-based control panel that meets the minimum requirements listed below:

9.1 The engine control system shall be integrated into the sound attenuating enclosure

on the driver's side of the pump. The control system shall be mounted on a single fascia plate. An emergency stop button shall be prominently located in the center control panel.

9.2 Electrical Specifications:

The panel shall have an operating voltage range of 5.5VDC to 36VDC include reverse polarity protection, transient voltage suppression and load dump protection. The panel shall have a "sleep mode" for standby/auto operation with a maximum current draw less than 15mA. The panel shall have a single analog inputs configurable via the panel for 4-20mA, 0-5VDC or ratiometric. The panel shall

have 8 digital inputs configurable as normally open or normally closed. The panel shall have relay outputs that can be configure for alarms, shutdowns or discrete outputs. The initial relay state shall be selectable as either "on" or "off" upon panel power up.

9.3 Environmental Specifications:

9.4 All internal panel components such as the display module and key switch shall be water tight, IP67 rated components with water tight connectors. The panel shall have a storage and operating temperature range of -40°C to +80°C.

9.5 Physical Specifications:

The panel shall have an OLED (organic light emitting diode) digital display with large ½" characters for easy viewing. The panel shall have both a yellow alarm lamp and a red shutdown lamp. The key switch shall be labeled with four positions (AUTO, OFF, RUN & CRANK). The panel keypad buttons shall be stainless steel domed membrane

switches that are water tight and provide a direct physical contact with a tactile response to the operator. Capacitive touch sensing buttons are not acceptable.

9.6 Operating Specifications:

9.6.1 Start/Stop: The panel shall be capable of both manual and automatic start/stop. Automatic start/stop shall function interchangeably from single float, dual float, pressure switch, level transducer or pressure transducer by selection via keypad buttons. The panel shall be capable of using a 4-20mA, 0-5V or ratiometric transducer for automatic start/stop.

9.6.2 Recharge Monitor: The panel shall have a battery recharge monitor system that can be selected that monitors the battery voltage during standby operation and will exercise the engine to recharge the battery according to selected settings.

9.6.3 Safety Shutdowns: Panel shall provide automatic shutdown in the following instances:

9.6.3.1 Low Oil Pressure.

9.6.3.2 High Engine Temperature

9.6.3.3 Over-Speed.

9.6.3.4 Emergency Stop.

9.6.3.5 Low Coolant Level.

9.6.3.6 Low Oil Level

9.6.3.7 Loss of Water Level.

9.6.3.8 Loss of Inlet Pressure.

9.6.3.9 Fuel Level.

9.6.4 When an "alarm" occurs, the following indication occurs:

9.6.4.1 RED LED Lamp Illumination.

9.6.4.2 Message on Display "Low Oil Pressure".

9.6.4.3 Engine shut down.

9.6.4.4 Alarm is stored in the alarm log.

9.6.5 The panel shall store a minimum of 32 alarms occurrences in the panel alarm

log. The alarm message and the engine hours at the time of the occurrence shall be provided in the log.

9.6.6 Panel Settings: All panel settings shall be available via the keypad buttons. No additional external devices are required to change panel settings. All operational settings shall be password protected. The panel shall have a label with instructions for accessing and navigating the panel settings.

9.6.7 Service/Maintenance: The panel shall have selectable service and maintenance messages and warnings.

9.6.8 Float Connectors: Two Four Pin Amp connectors with screw with water tight

sealing caps with beaded chain lanyards shall be provided for single or dual float operation.

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

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PARAMETERS

The sound attenuating pump is intended for operation in areas where space is limited, it is, therefore, essential that the pump overall operating dimensions shall be of a limited. Maximum operating parameters are:

- 10.1 Length: 152.0
- 10.2 Width: 79.1
- 10.3 Height: 71.2
- 10.4 Weight: 3,565 (Less fuel)

<p>Bidder's Response. Meets or exceeds specifications <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, explain _____</p> <p>_____</p> <p>_____</p>

11.0 WARRANTY

The pump-set shall be warranted for a period of not less than 24 months or 2000 hours, whichever occurs first. A copy of bidder's warranty form shall be provided as specified in required documents (12.0). Bidder shall maintain a service and repair facility within a xx mile radius of the (City/State, etc. of xx) shall also provide an uptime guarantee. The uptime guarantee shall provide, if at any time during the warranty period that a warrantable failure occurs, where on-site repairs cannot be made within a 24 hour period, at no-charge a replacement pump-set of similar size and performance characteristics will be provided within the aforesaid 24 hour period. Bidder shall provide specific details of this warranty as required in section.

Bidder's Response. Meets or exceeds specifications Yes No

If no, explain _____

12.0 BIDDER'S RESPONSE FORM

Information required with submission of bid:

Please note: Failure to provide information requested may result in your bid being considered non-responsive.

12.1 Make / Model of Pump being offered: _____

12.1.1 Hose/Pipe Flange Connections: _____ Inches x _____ Inches.

12.2 Make/ Model of engine being offered: _____

12.3 Emission certification: _____

12.4 Performance documentation:	Yes	No
12.4.1 Head / Capacity.	___	___
12.4.2 Pump absorbed power curve.	___	___
12.4.3 NPSH-R Feet data.	___	___
12.4.4 Solids Handling Capability shown on curve.	___	___
12.4.5 Capacity: 700 GPM @ 130 feet total head with @ 37.0 BHP power consumption/ 25 feet suction lift.	___	___
12.4.6 Capacity: 400 GPM @ 160 feet total head with 37.0 BHP power consumption/ 28 feet suction lift.	___	___
12.5 Shaft Seal capable of dry operation.	___	___
12.7 Drawing showing dimensions and weights parameters (Section 10.0).	___	___
12.8 Spherical solids handling capability not less Than 1.6 inches (Section 2.0).	___	___
12.9 Rotationally molded sound attenuating enclosure and fuel cell of specified material.	___	___
12.10 Trailer certified by independent Professional Engineer.	___	___
12.11 Bidder's warranty form (Section 11.0).	___	___
12.12 Fuel cell rated for 43 hour run time.	___	___
12.13 Engine conversion to final tier 4 possible?	___	___
12.14 Location of bidder's service facility.		
