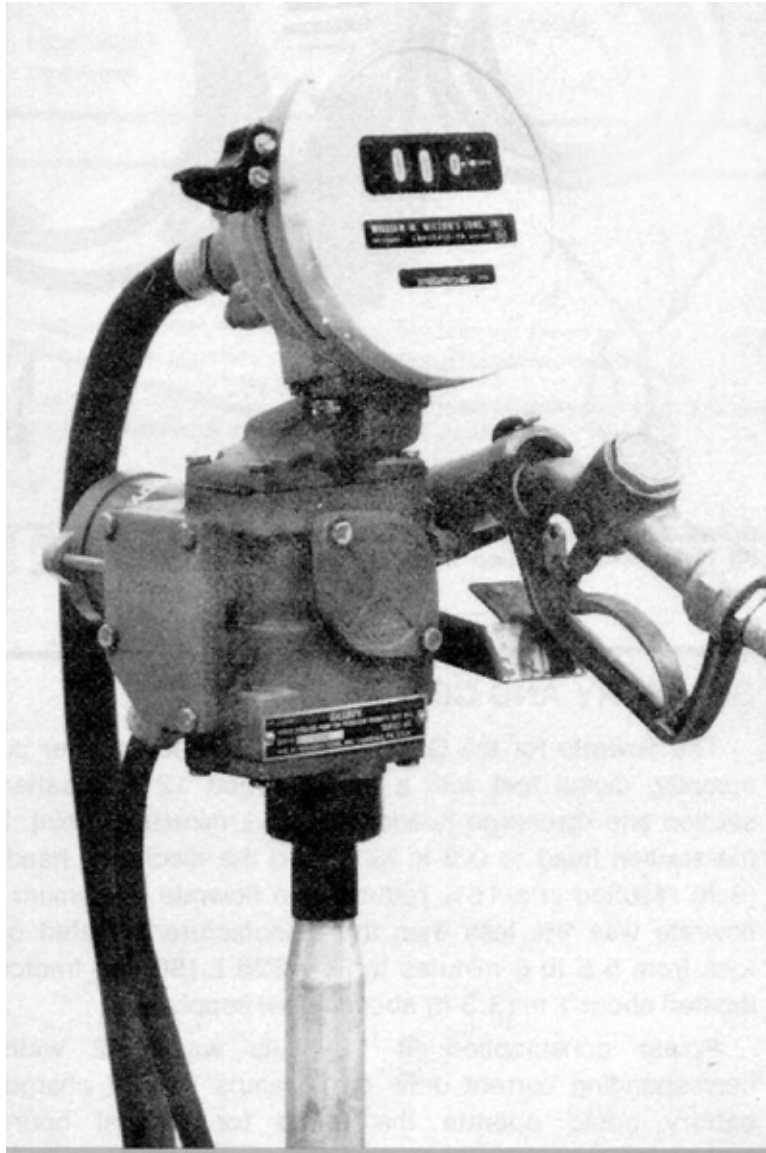


Evaluation Report

75



Gasboy Model 60 Fuel Transfer Pump

A Co-operative Program Between



GASBOY MODEL 60 FUEL TRANSFER PUMP

MANUFACTURER:

Gasboy of Canada Ltd.
430 Industrial Road
London, Ontario
N5V 2Y3

DISTRIBUTOR:

Westeel-Rosco Ltd.
4111 - 15A St. S.E.
Calgary, Alberta
T2G 3P2

RETAIL PRICE:

\$325.00 (January, 1979, f.o.b. Lethbridge)

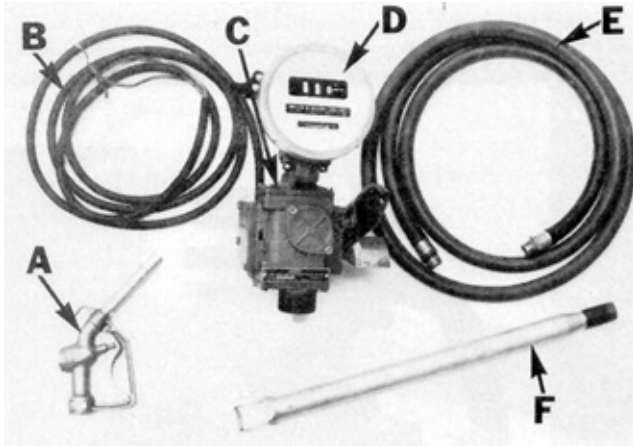


FIGURE 1. Gasboy Model 60 Fuel Transfer Pump. (a) Outlet Nozzle, (B) Battery Cable, (C) Pump Body, (D) Pump Meter, (E) Outlet Hose, (F) Telescoping Suction Pipe.

SUMMARY AND CONCLUSIONS

The flowrate for the Gasboy Model 60 fuel transfer pump when pumping diesel fuel with a fully charged 12 volt battery at zero suction and discharge heads was 41 L/min (9 gal/min). Increasing the suction head to 0.9 m (3 ft) and the discharge head to 2.7 m (9 ft) resulted in a 15% reduction in flowrate. Maximum measured flowrate was 9% less than the manufacturer's stated capacity. It took from 5.5 to 6 minutes to fill a 225 L (50 gal) tractor fuel tank located about 1 m (3.3 ft) above a fuel supply tank.

Power consumption at 12 volts was 192 watts with a corresponding current draw of 16 amps. A fully charged 12 volt battery could operate the pump for several hours without recharging.

The Gasboy 60 was very portable. The pump was difficult to install in a fuel supply tank since the bung adaptor did not rotate relative to the pump body and the entire pump body and hose had to be turned. Connecting the battery cable leads to the battery terminals was difficult.

The motor had a 30 minute continuous duty cycle. As a result, from 1050 to 1230 L (231 to 271 gal) could be continuously pumped before the motor had to be allowed to cool.

The Gasboy 60 was equipped with a suction strainer that was easily serviced by removing the bung adaptor from the pump body.

The Gasboy 60 was safe to operate if normal safety precautions for transferring fuel were observed.

No operating instructions or parts list were supplied with the pump.

One problem was encountered during the test. The outlet hose could not be sufficiently tightened to the pump meter due to interference caused by the two bolts at the meter opening.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Supplying a rotating bung adaptor.
2. Providing a means of holding the battery cable leads to the battery terminals.
3. Providing a means of locking the pump nozzle to the pump body to prevent theft.
4. Modifications to the pump meter opening to permit easier tightening of the outlet hose.
5. Supplying operating instructions and parts list with each pump.

Chief Engineer: E. O. Nyborg

Senior Engineer: E. H. Wiens

Project Technologist: L. B. Storozynsky

THE MANUFACTURER STATES THAT:

With regard to recommendation number:

1. Field experience with the rotating bung adaptor has resulted in complaints of the units loosening due to road vibrations. We have had no problems since we changed to the present bung arrangement.
2. We could provide alligator clamps but this would not, in our opinion, be a very satisfactory arrangement. We find that with the new style battery terminal it would not work. Also, field reports tell us that a great percentage of users splice the cable into the solenoid valve.
3. We are investigating a lock device.
4. The casting will be changed to eliminate this problem.
5. Parts and operating instructions are included with each pump.

GENERAL DESCRIPTION

The Gasboy Model 60 is a self-priming, positive displacement rotary vane pump driven by a 12 volt DC electric motor adaptable to either negative or positive ground vehicle electrical systems. It is designed for pumping gasoline, kerosene or diesel fuel from above ground tanks and drums equipped with 50 mm (nominal 2 inch NPT) openings. It is equipped with an 870 mm (34 in) telescoping suction pipe, a 3.9 m (12.8 ft) outlet hose with standard fuel pump nozzle, a 4.7 m (15.5 ft) battery cable and a meter with a 99.9 gallon register. It is supplied with an automatic bypass valve to permit intermittent pumping while the motor is running. The nozzle when not in use is stored within a dust shielded receptacle on the pump body.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The Gasboy Model 60 was evaluated for ease of operation, power consumption and safety. Pump performance characteristics at various voltages, suction and discharge heads were determined with diesel fuel.

RESULTS AND DISCUSSION

PUMP PERFORMANCE

Flowrates: Pump performance characteristics with diesel fuel at two suction heads over a typical range of discharge heads are given in FIGURE 2. Suction head is the distance the fuel level is below the pump and discharge head is the height the outlet nozzle is held above the pump. The suction heads of 0 and 0.9 m (0 and 3 ft)

correspond to full and empty levels of typical farm truck fuel storage tanks. The flowrates in FIGURE 2 are for a pump powered with a fully charged 12 volt battery.

The maximum flowrate of 41 L/min (9 gal/min) was obtained at zero suction and discharge heads. Increasing suction and discharge heads reduced the flowrate. For example, increasing the suction head to 0.9 m (3 ft) and the discharge head to 2.7 m (9 ft), resulted in the flowrate decreasing to 35 L/min (7.7 gal/min). This combination of suction and discharge heads is more severe than would be encountered in transferring fuel to most farm machinery and represents a 15% decrease in flowrate.

In filling a typical farm tractor, with filler opening about 1 m (3.3 ft) above the top of the fuel supply tank and with the fuel supply tank one-half full, flowrate would be about 40 L/min (8.8 gal/min).

The maximum flowrate of 41 L/min (9.0 gal/min) was 9% less than the manufacturer's stated flowrate of 45 L/min (10 gal/min).

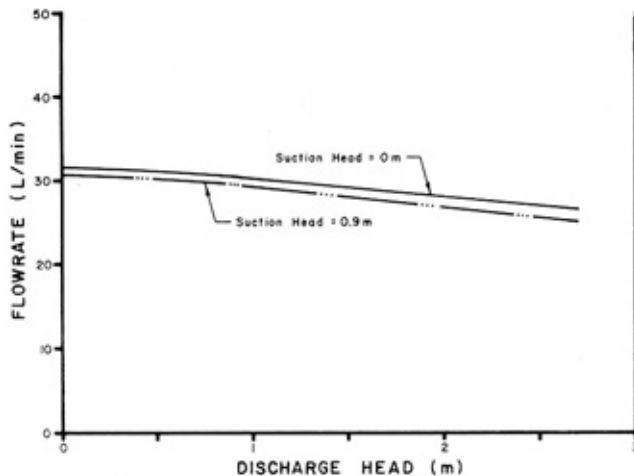


FIGURE 2. Pump Performance Characteristics with Diesel Fuel when Powered with Fully Charged 12 Volt Battery.

Duty Cycle: Adequate protection was provided to prevent the pump motor from burning out due to continuous operation or operating on bypass for too long. The pump was equipped with a thermal overload protector located between the electric motor and the rotary vane. Tests showed that the pump, under normal operating conditions, could run longer than the 30 minute continuous duty cycle specified by the manufacturer before the thermal protector stopped the pump. The pump automatically shut off when the temperature in the vicinity of the thermal protector reached about 60 °C.

Meter: The Gasboy Model 60 was equipped with a meter with two registers. The register with the large numbers recorded delivery up to 99.9 gallons. This register was easily re-zeroed by pushing down on the meter lever. The second register recorded the total delivery up to 99,999 gallons. The meter registered 2% higher than actual fuel flow.

POWER CONSUMPTION

FIGURE 3 shows the effect of battery voltage on flowrates and also indicates the corresponding current draw. A fully charged 12 volt battery will deliver 12 volts. Since the current draw at 12 volts was only 16 amps, the maximum flowrate of 41 L/min (9 gal/min) can be expected for several hours operation with a good battery, without recharging. There should, therefore, be no need to consider charging a truck battery by running the truck motor while refueling. A running engine could result in the exhaust igniting fuel vapours.

A typical battery under charge will deliver in excess of 12 volts. At 14 volts the flowrate was increased to 42 L/min (9.2 gal/min) with corresponding current draw of 19 amps. This means that the flowrate increased only 2% but the current draw increased 19% while charging the battery during pumping. As a result, power consumption was increased from 192 watts at 12 volts to 266 watts at 14 volts. Since most of the additional power has to be

dissipated as heat in the pump motor, operating the pump with the battery under charge would serve to decrease the pump duty cycle, due to motor overheating, with only negligible increase in flowrates. This further substantiates that the pump not be operated while vehicle engines are running.

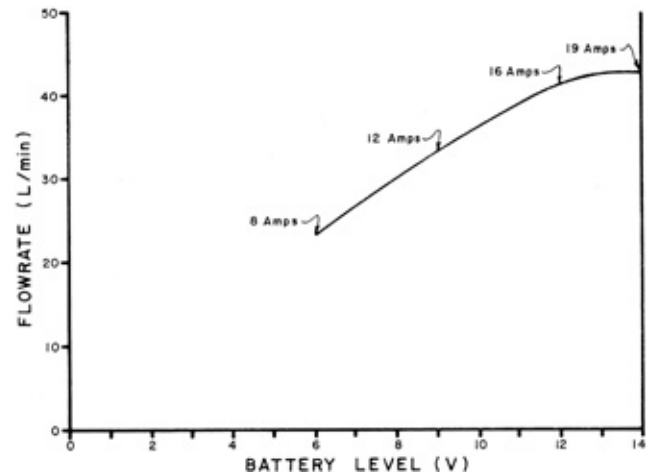


FIGURE 3. Flowrates with Diesel Fuel at Zero Suction and Discharge Heads for Various Battery Voltages.

EASE OF OPERATION

Fuel Tank Connection: The Gasboy Model 60 was portable and was equipped with a 50 mm (nominal 2 inch NPT) bung adaptor to fit standard fuel tank openings. The bung adaptor could not be turned relative to the pump body, making it difficult to install in a fuel tank since the entire pump body and hose had to be turned. A rotating bung adaptor is recommended to eliminate this problem.

Electrical Connection: The pump could be operated on either positive or negative ground vehicle electrical systems. However, care had to be taken to install the black cable lead to the ungrounded battery terminal. Connecting the battery cable to the vehicle battery terminals was difficult since there was no means of clamping the cable leads to the battery terminals. It is recommended that the manufacturer provide a means of attaching the cable leads to a battery.

Filling A Fuel Tank: The outlet hose was equipped with a standard lever operated fuel nozzle. It took about 44 N (10 lb) hand force to hold the nozzle valve open. The automatic by-pass valve in the pump permitted intermittent closing of the nozzle valve while the motor was running.

It took from 5.5 to 6 minutes to fill a 225 L (50 gal) tractor fuel tank with filler opening typically located 1 m (3.3 ft) higher than the top of a typical farm truck fuel supply tank. An automatic nozzle and hose swivel is available as optional equipment. The pump motor had a 30 minute continuous duty cycle. As a result, from 1050 to 1230 L (231 to 271 gal) could be continuously pumped before the electric motor had to be allowed to cool.

Servicing: The Gasboy Model 60 was equipped with a suction fuel strainer. The mesh strainer could be serviced by removing the bung adaptor on the pump body. The pump and motor required no lubrication.

SAFETY

The Gasboy Model 60 was equipped with a safety switch. The pump motor could be turned on only when the outlet nozzle was removed from its storage receptacle. The nozzle could not be returned to the storage receptacle unless the pump motor switch was turned off.

The pump nozzle could not be locked to the pump body. It is recommended that the manufacturer consider providing a means of locking the nozzle to the pump body to prevent unauthorized use.

To prevent possible ignition of fuel vapour from engine exhaust, it is advised when using the pump that the vehicle engine be shut off.

Since the current draw of the pump was only 16 amps at a battery voltage of 12 volts, there was no need to charge the battery while pumping. A fully charged battery would provide several hours of, pumping before recharging was necessary.

OPERATOR'S MANUAL

No parts list or operating instructions were supplied with the Gasboy Model 60. It is recommended this information be supplied with each pump.

MECHANICAL PROBLEMS

The Gasboy Model 60 was operated for about 6 hours. The intent of the test was an evaluation of functional performance and an extended durability evaluation was not conducted.

One problem was encountered during the functional evaluation. It was difficult to tighten the outlet hose to the meter since it was impossible to get a wrench between the two meter bolts (FIGURE 4). Using a pipe wrench damaged the outlet hose fastener. It is recommended that the manufacturer make modifications to prevent this problem.

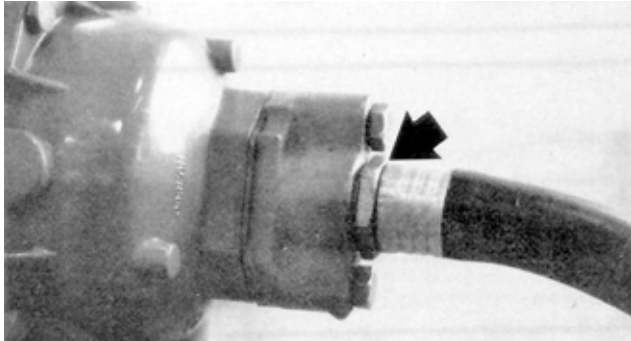


FIGURE 4. Impossible to Tighten with Wrench due to Meter Bolts.

APPENDIX I

SPECIFICATIONS

MAKE:	Gasboy Fuel Transfer Pump
MODEL:	60
SERIAL NUMBER:	61760
DUTY CYCLE:	
- normal operation	30 minutes
OVERALL DIMENSIONS:	
- height	398 mm (15.7 in)
- width	280 mm (11 in)
- length	300 mm (11.8 in)
TOTAL WEIGHT:	20 kg (44 lb)
SUCTION PIPE:	
- size	25 mm (nominal 1 inch NPT)
- telescoping length	490 to 870 mm (19.25 to 34.25 in)
- storage tank bung adaptor	50 mm (nominal 2 inch NPT)
DISCHARGE HOSE:	
- size	20 mm (0.75 in)
- length (with nozzle)	3.9 m (12.8 ft)
MOTOR:	
- power requirement	12 VDC
- polarity	either negative or positive
- battery cable length	47 m (15.5 ft)
- battery connectors	none

APPENDIX II

METRIC UNITS

In keeping with the Canadian metric conversion program, this report has been prepared in SI units. For comparative purposes, the following conversions may be used:

1 litre per minute (L/min)	= 0.22 Imperial gallons per minute (gal/min)
1 metre (m) = 1000 millimetres (mm)	= 39.37 inches (in)
1 Newton (N)	= 0.22 pounds force (lb)
1 kilogram (kg)	= 2.20 pounds mass (lb)



**ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE**

3000 College Drive South
Lethbridge, Alberta, Canada T1K 1L6
Telephone: (403) 329-1212
FAX: (403) 329-5562
<http://www.agric.gov.ab.ca/navigation/engineering/afmrc/index.html>

Prairie Agricultural Machinery Institute

Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0
Telephone: (306) 682-2555

Test Stations:
P.O. Box 1060
Portage la Prairie, Manitoba, Canada R1N 3C5
Telephone: (204) 239-5445
Fax: (204) 239-7124

P.O. Box 1150
Humboldt, Saskatchewan, Canada S0K 2A0
Telephone: (306) 682-5033
Fax: (306) 682-5080