pami

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Evaluation Report

Report On

BERKELEY 4AL22 SUBMERSIBLE DEEP WELL PUMP - 128

prairie agricultural machinery institute

Humboldt, Saskatchewan · Lethbridge, Alberta · Portage la Prairie, Manitoba

DIRECTOR ..... J.A. Peck

BERKELEY 4AL22 SUBMERSIBLE DEEP WELL PUMP

MANUFACTURER:

Berkeley Pump Company
829 Bancroft Way
Berkeley, California
94710 U.S.A.

RETAIL PRICE:

$490.00 (f.o.b. Winnipeg, October, 1978)

DISTRIBUTORS:

Allied Electric Motor and Pump Ltd.
833 Sargent Avenue
Winnipeg, Manitoba
R3E 0C1

Arrow Irrigation
P.O. Box 861
Strathmore, Alberta
T0J 3H0

Central Irrigation Company Ltd.
P.O. Box 730
Outlook, Saskatchewan
S0L 2N0

SUMMARY AND CONCLUSIONS

Measured capacity of the Berkeley 4AL22 submersible pump varied from 43.2 L/min to 7.6 L/min over a range of discharge heads from 2.25 to 150 m. Capacity was 11% lower than the manufacturer's published data at peak efficiency.

Peak pump-motor efficiency of 24% occurred at a discharge head of 128 m with a flow of 23 L/min. The corresponding power output was 0.42 kW.

The operator's manual was clearly written, containing comprehensive installation, servicing and operating instructions.

No electrical wiring kit was provided.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

Modifying the operator's manual to include recommendations that a relief valve be installed on the pressure tank and that a suitable safety line be attached to the pump during installation.

Chief Engineer - E. O. Nyborg
Senior Engineer - I. C. Thauberger
Project £ngineer- R. R. Hochstein

THE MANUFACTURER STATES THAT

With regard to the recommendation:

When the Operator's Manual is next reprinted, we will review it and add information on the relief valve, which must be installed on the pressure tank, and on the safety line which should be attached to the newly designed top case, which has loop holes provided.

GENERAL DESCRIPTION

The Berkeley 4AL22 is a 100 mm diameter, 22 stage, deep well, submersible water pump with a 25 mm (nominal 1 inch NPT) discharge outlet, designed for use in wells up to 150 m deep. It is powered by a 230 V, 0.56 kW Franklin electric motor. The Berkeley 4AL22 is not recommended for use during well development.

Detailed specifications are given in APPENDIX I.

SCOPE OF TEST

The performance characteristics of the Berkeley 4AL22 were determined with water, over a full range of discharge heads, using a standard pump testing procedure.[1] In addition, operator's manual suitability and pump safety aspects were assessed.

RESULTS AND DISCUSSION

PERFORMANCE CHARACTERISTICS

Pump performance characteristics, over a range of discharge heads from 2.25 to 157 m of water are given in FIGURE 1. Maximum flow rate at 2.25 m discharge head was 43.2 L/min while flow ceased at a discharge head of 157 m. The manufacturer's published performance data indicated higher pumping rates than those obtained, over the full range of discharge heads. At the point of peak pump-motor efficiency the manufacturer's published data exceeded the PAMI test data by 11%. The peak efficiency, occurring at a head of 128 m, was 24%. The corresponding flow rate was 23 L/min.

Maximum power output was 0.42 kW, occurring at the peak efficiency point, with a corresponding current draw of 7.8A Reducing the line voltage from 230 volts to 204 volts did not have any appreciable effect on the overall performance.

OPERATOR'S MANUAL

The operator's manual was clearly written and contained comprehensive installation, servicing and operating instructions. Although two 6 mm diameter eyes were provided on the pump for attachment of a safety line, installation instructions did not suggest use of a line when installing the pump. It is suggested that the operator's manual be expanded to include recommendations on the use of a suitable safety line. Plastic pipe can be easily dama(ged, during installation, or clue to unexpected pumping pressure. When installing the pump with galvanized pipe, security would also be assured during coupling of successive pipe lengths.

SAFETY ASSESSMENT

Three methods of splicing the motor drop cable were clearly explained in the operator's manual. All methods provided safe electrical connections if the instructions were closely followed.

The operator's manual did not give a minimum pressure rating for the discharge line and did not warn against installation of a pressure tank without a suitable pressure relief valve. Multi-stage pumps develop very high pressures which could cause pressure tank rupture. It is recommended that the operator's manual be expanded to include pressure relief valve recommendations.

1. PAMI T7821, Detailed Test Procedures for Domestic Water Pumps.

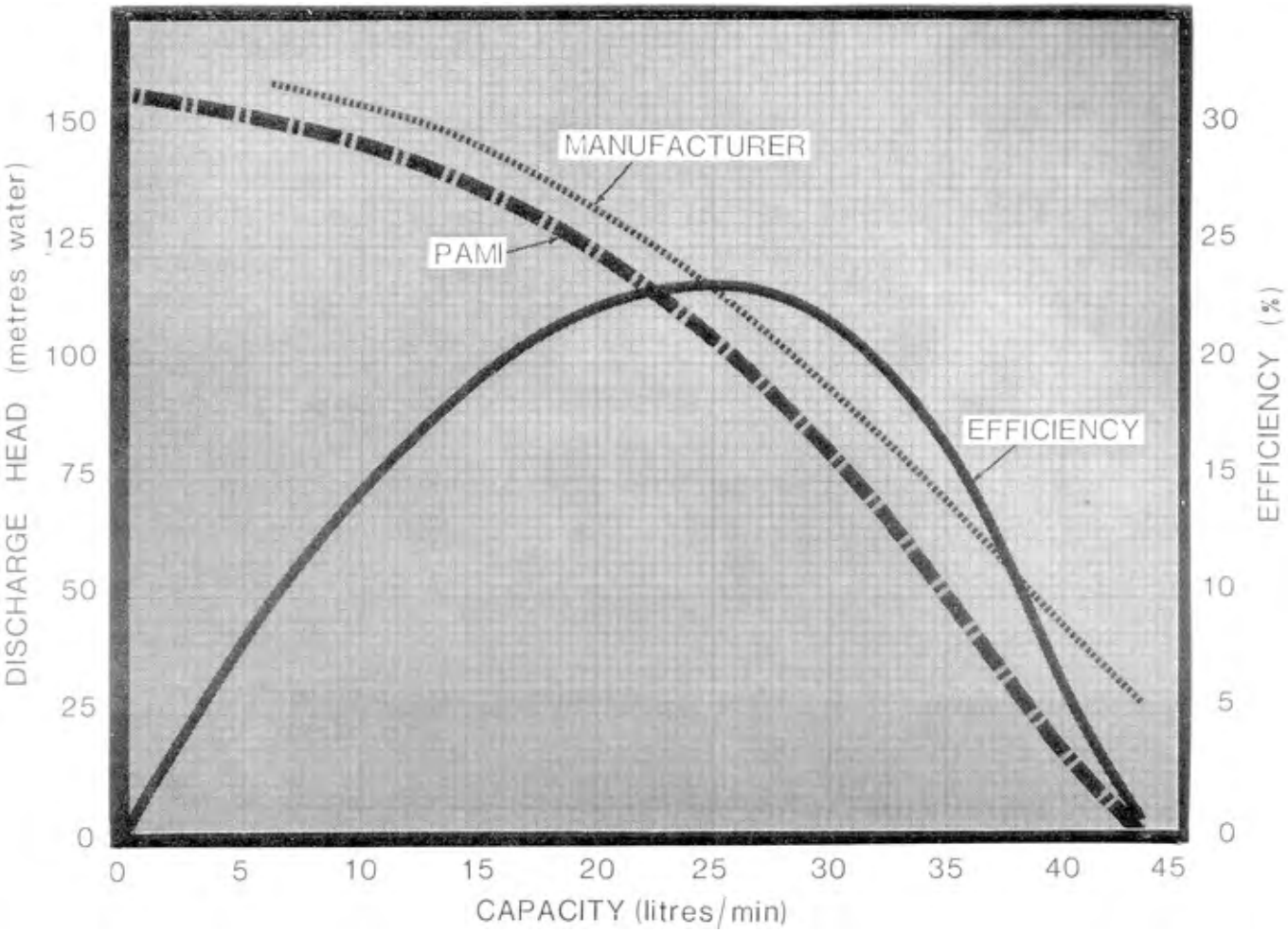

FIGURE 1. Performance Characteristics.

APPENDIX 1

SPECIFICATIONS:

Pump:	
--make	Berkeley
--model	4AL22
--serial number	4
--number of impellers	22
--speed	3450 rpm
Motor:	
--make	Franklin Electric
--model	2143074116 Date Code C77
--size	0.56 kW (0.75 hp)
--voltage	230V
--ampere rating	6.4A
--service factor amperage	7.7A
--service factor	1.5
--speed	3450 rpm
Overall Dimensions:	
--motor length	300 mm (11 in)
--pump length	730 mm (28.75 in)
--total length	1170 mm (46 in)
--clearance diameter	95 mm (3.75 in)
Total Weight:	21.3 kg (47 lb)

Inlet:	
-- location	406 mm (16 in) above pump foot
-- screen type	plastic
-- screen mesh	1.7 mm (0.067 in)
-- inlet area	14200 mm^2 (22 in^2)
Outlet:	
-- nominal size	25 mm (1 in NPT)
Rope Eyes:	
-- number	2
-- diameter	6 mm (0.25 in)

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 metre (m)	= 1000 millimetres (mm) = 39.37 inches (in)
1 kilopascal (kPa)	= 0.102 metres water = 0.145 pounds/square inch (psi)
1 litre/min (L/min)	= 0.22 Imperial gallon/minute (gal/min)
1 kilowatt (kW)	= 1.34 horsepower (hp)

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