

# EVALUATION REPORT 329



## LLOYD'S MODEL RE-140 LIFT PUMP

A Co-operative Program Between



# LLOYD'S MODEL RE-140 LIFT PUMP

## MANUFACTURER AND DISTRIBUTOR:

Lloyd's Manufacturing Ltd.  
P.O. Box 850  
Wadena, Saskatchewan  
S0A 4J0

## RETAIL PRICE:

\$6965.00 (December 1983, f.o.b. Lethbridge, Alberta; with 50 ft (15.2 m) of rubber hose and two hose clamps.)

## THE MANUFACTURER STATES THAT

With regard to recommendation number:  
If the pump is operated at high total head, we recommend the use of two cover gasket clamps to eliminate leakage.

## GENERAL DESCRIPTION

The Lloyd's model RE-140 is a 16 in (405 mm) diameter centrifugal pump. It consists of an impeller, discharge tube and lift mechanism mounted on a mainframe supported by a single axle and two wheels. Power is supplied through a 1000 rpm power take-off. The test machine was equipped with 50 ft (15.2 m) of 16 in (405 mm) diameter rubber discharge hose.

FIGURE 1 shows the location of major components while detailed specifications are given in APPENDIX I.

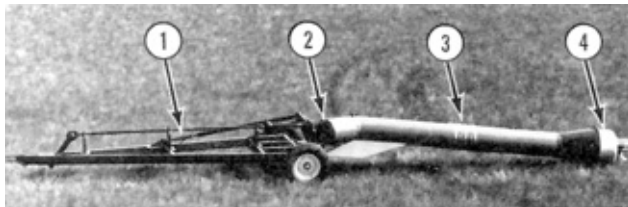


FIGURE 1. Lloyd's Model RE-140 Lift Pump: (1) Lift Mechanism, (2) Discharge Tube, (3) Bearing Inspection Plate, (4) Impeller.

## SCOPE OF TEST

The Lloyd's model RE-140 was operated for about 16 hours while pumping water. Performance characteristics were determined with water over a range of discharge heads and speeds. Ease of operation, operator safety and suitability of the operator's manual were also evaluated.

## RESULTS AND DISCUSSION

### PERFORMANCE CHARACTERISTICS

**Flow Rate:** Flow rate characteristics of the Lloyd's model RE-140 pump are given in FIGURE 2 for a range of total heads and power take-off speeds. Performance curves were determined for a 37 in (940 mm) inlet submergence depth as measured from the water surface to the centre of the impeller.

Maximum flow rate at 15.0 ft (4.6 m) total head was 7300 gal/min (33,185 L/min) for the 1000 rpm power take-off speed. The manufacturer's stated capacity was 7000 gal/min (31,850 L/min).

Flow rate increased for increasing power take-off speeds. For example, flow at 40.0 ft (12.2 m) total head increased from 2250 to 6800 gal/min (10,230 to 30,910 L/min) when power take-off speed was increased from 700 to 1000 rpm. Increasing power take-off speed also increased the head at which flow ceased. For example, at a 540 rpm power take-off speed, flow ceased at 26 ft (7.9 m) total head while at a power take-off speed of 1000 rpm, flow ceased at 86 ft (26.2 m) total head.

## SUMMARY AND CONCLUSIONS

**Performance Characteristics:** Performance of the Lloyd's model RE-140 lift pump was very good. Measured water flow rate at 1000 rpm power take-off speed varied from 7300 to 4000 gal/min (33,185 to 18,185 L/min) over a range of total heads from 15.0 to 75.0 ft (4.6 to 22.9 m) with a 37 in (940 mm) inlet submergence depth. A peak efficiency of 47% occurred at a 1000 rpm power take-off speed and 5500 gal/min (25,000 L/min) flow rate. Maximum power required at 1000 rpm power take-off speed was 232 hp (173 kW).

**Ease of Operation:** Hitching the model RE-140 was easy. Caution had to be used when transporting on rough roads due to bouncing as a result of the negative hitch weight. The pump was easy to service and positioning of the model RE-140 at a pump site was easy.

**Operator Safety:** The pump was safe to use if common sense was exercised.

**Operator's Manual:** The operator's manual was clearly written and included a well illustrated parts list.

**Mechanical Problems:** Two mechanical problems occurred during testing. The transport lock bent due to bouncing of the inlet and discharge tube while travelling over rough roads and the discharge tube bearing inspection plate seal leaked and broke when operated at total heads above 53 ft (16.2 m).

## RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Providing an adequate discharge tube bearing inspection plate seal.

Senior Engineer: E. H. Wiens

Project Engineer: M. V. Eliason

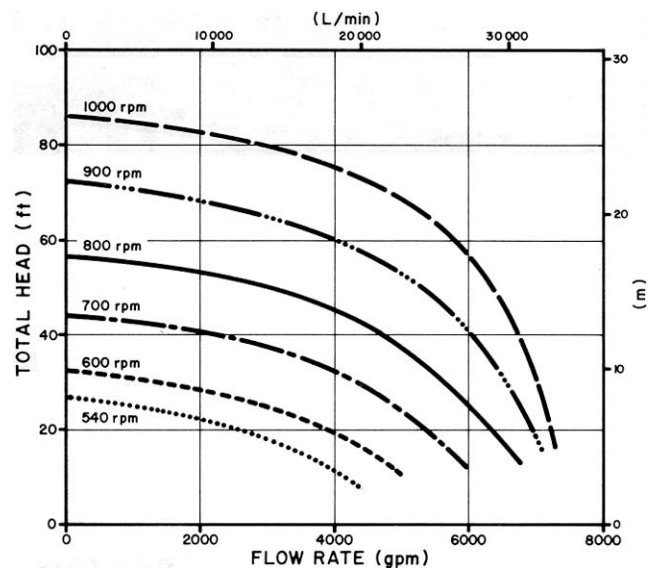


FIGURE 2. Lloyd's Model RE-140 Performance Curves at Various Power Take-off Speeds.

**Power Requirements:** FIGURE 3 shows the power required to operate the Lloyd's model RE-140 pump at various power take-off speeds and flow rates. The maximum power required at a 1000 rpm power take-off speed was 232 hp (173 kW).

**Pump Efficiency:** FIGURE 4 shows the pump efficiency of the model RE-140 at various flow rates and power take-off speeds. A peak efficiency of 47% occurred at a 1000 rpm power take-off speed and 5500 gal/min (25,000 L/min) flow. Peak efficiencies at other power take-off speeds were less.

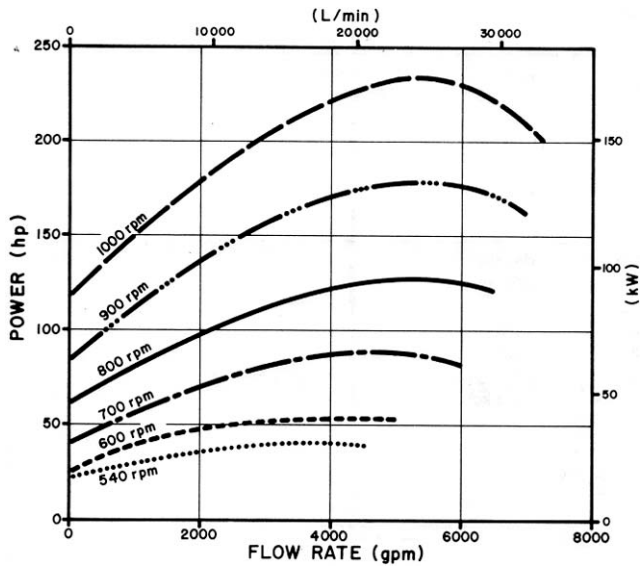


FIGURE 3. Power Requirements to Operate the Lloyd's Model RE-140 Pump at Various Flow Rates and Power Take-off Speeds.

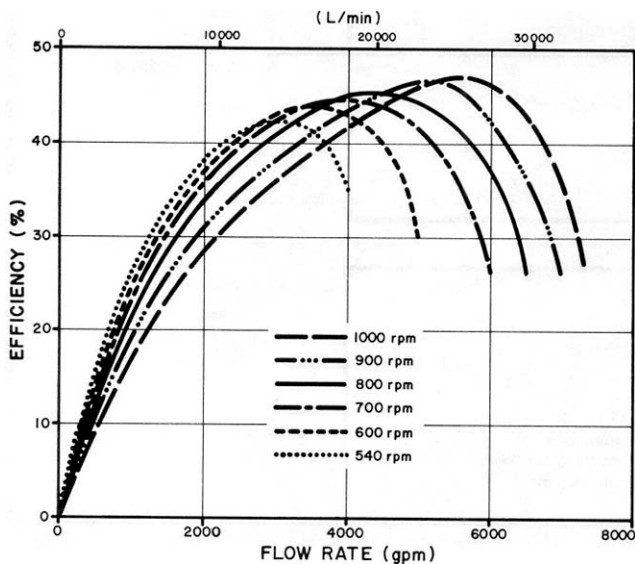


FIGURE 4. Pump Efficiency of the Lloyd's Model RE-140 at Various Flow Rates and Power Take-off Speeds.

### EASE OF OPERATION

**Installation:** Positioning the Lloyd's model RE-140 at the pump site was easy. The 18.3 ft (5.6 m) discharge tube reach was adequate for most pumping installations. The pump inlet was easily lowered and the rubber discharge hose could be easily installed by two people.

**Hitching:** The Lloyd's model RE-140 was equipped with a fixed clevis hitch which was suitable for most tractor drawbars. Caution had to be exercised when hitching due to the negative hitch weight. Lowering the inlet housing, to adjust the hitch weight, permitted easy hitching.

**Transporting:** The Lloyd's model RE-140 towed well on smooth roads at speeds up to 55 mph (90 km/h). On rough roads the negative hitch weight caused bouncing of the inlet and discharge tube. Caution had to be exercised when towing on rough roads.

**Servicing:** The model RE-140 had eight grease fittings on the drive shaft, two grease fittings on the lift mechanism and two wheels that required servicing. Lubrication was convenient with good access to all grease fittings.

Water lubricated bearings supported the impeller drive shaft within the discharge tube. To avoid failure, lubricated bearings must be submerged in water before operating the pump.

### OPERATOR SAFETY

The model RE-140 was safe to operate if common sense was used. Care had to be exercised when priming the discharge system to prevent excessive shock loads and possible discharge hose whipping.

### OPERATOR'S MANUAL

The operator's manual was clearly written and contained useful operating and assembly instructions. A well illustrated parts list was included.

### MECHANICAL PROBLEMS

The intent of the test was evaluation of functional performance. An extended durability evaluation was not conducted. Two mechanical problems occurred during the 16 hours of operation. The transport lock bent (FIGURE 5) due to bouncing of the inlet and discharge tube while travelling over rough roads. When operating the Lloyd's model RE-140 at total heads above 53 ft (16.2 m), the discharge tube bearing inspection plate seal leaked and broke. It is recommended that an adequate discharge tube bearing inspection plate seal be provided.

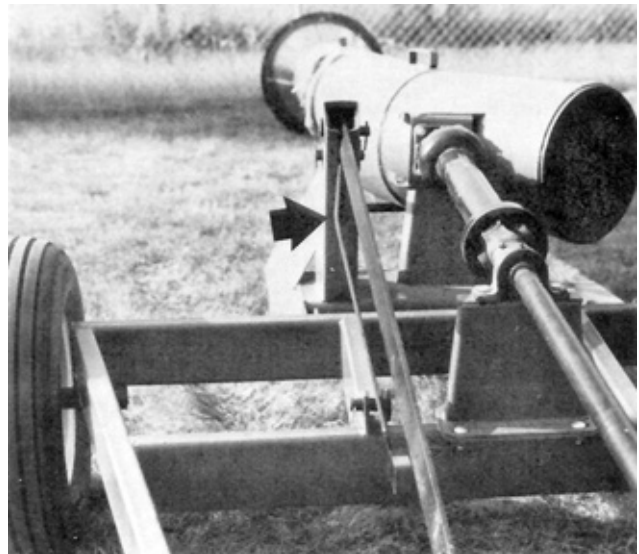


FIGURE 5. Bent Transport Lock.

**APPENDIX I**

**SPECIFICATIONS**

<b>MAKE:</b>	Lloyd's	
<b>MODEL:</b>	RE-140	
<b>SERIAL NUMBER:</b>	83-0198-16	
<b>MANUFACTURER:</b>	Lloyd's Manufacturing Ltd. P.O. Box 850 Wadena, Saskatchewan S0A 4J0	
<b>OVERALL DIMENSIONS:</b>		
- length	34.8 ft	(10,590 mm)
- width	7.6 ft	(2310 mm)
- height		
- field position	3.8 ft	(1145 mm)
- transport position	5.3 ft	(1600 mm)
- tire tread	6.8 ft	(2080 mm)
<b>INLET DIAMETER:</b>	11.5 in	(290 mm)
<b>IMPELLER:</b>		
- number of vanes	8	
- diameter	19 in	(485 mm)
<b>OUTLET DIAMETER:</b>	16 in	(405 mm)
<b>WEIGHT:</b>		
- left wheel	1010 lb	( 445 kg)
- right wheel	1010 lb	( 468 kg)
- hitch	- 240 lb	(-108 kg)
<b>TOTAL</b>	1810 lb	(815 kg)
<b>LUBRICATION POINTS:</b>		
- drive shaft	8, five hour service	
- lift mechanism	2, weekly service	
<b>TIRE:</b>	2, 9.5L-15SL, 6-ply	

**APPENDIX II**

**MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:  
Excellent  
Very Good  
Good  
Fair  
Poor  
Unsatisfactory

**APPENDIX III**

**CONVERSION TABLE**

feet (ft) x 0.305	= metres (m)
imperial gallons (gal) x 4.55	= litres (L)
horsepower (hp) x 0.75	= kilowatts (kW)
inches (in) x 25.4	= millimeters (mm)
miles/hour (mph) x 1.61	= kilometres/hour (km/h)
pounds (lb) x 0.45	= kilograms (kg)



**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