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Test 839: Oliver 1800

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 839 - OLIVER 1800 SERIES B GASOLINE

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean; H. H. Kramer, Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb	

MAXIMUM POWER AND FUEL CONSUMPTION

Rated Engine Speed—Two Hours								
80.16	2200	6.601	0.505	12.14	173	58	75	29.058

VARYING POWER AND FUEL CONSUMPTION—TWO HOURS

70.31	2269	6.205	0.541	11.33	174	58	76	..
0.00	2400	2.378			166	57	73	..
36.14	2334	4.311	0.731	8.38	173	58	75	..
80.15	2200	6.581	0.503	12.18	174	58	75	..
18.31	2365	3.347	1.121	5.47	168	58	74	..
53.63	2309	5.314	0.607	10.09	174	57	73	..
Av 43.09	2313	4.689	0.667	9.19	172	57	74	29.043

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption		Hp-hr per gal	Temp Degrees F			Barometer inches of Mercury
					Gal per hr	Lb per hp-hr		Cooling med	Air wet bulb	Air dry bulb	

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—4th Gear Hydra-Power											
67.81	6839	3.72	2204	7.16	6.875	0.622	9.86	182	67	79	28.900
75% of Pull at Maximum Power—Ten Hours—4th Gear Hydra-Power											
55.47	5275	3.94	2289	5.27	6.033	0.667	9.19	180	64	77	29.037
50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power											
37.96	3493	4.08	2325	3.69	4.934	0.797	7.69	179	72	85	28.813

MAXIMUM POWER WITH BALLAST

58.33	10827	2.02	2258	14.94	2nd Gear Hydra-Power	172	55	62	29.010
67.72	8946	2.84	2201	10.09	2nd Gear	178	56	63	29.000
68.49	8805	2.92	2201	9.77	3rd Gear Hydra-Power	177	56	63	29.000
69.52	7042	3.70	2201	7.53	4th Gear Hydra-Power	178	56	58	28.890
69.04	6282	4.12	2204	6.57	3rd Gear	178	61	68	28.920
69.01	5013	5.16	2199	5.17	4th Gear	178	61	68	28.920
70.13	4429	5.94	2199	4.67	5th Gear Hydra-Power	180	61	68	28.920
68.81	3145	8.20	2199	3.28	5th Gear	182	61	68	28.920
67.25	2410	10.46	2197	2.69	6th Gear Hydra-Power	180	65	75	28.920
62.41	1623	14.42	2201	1.63	6th Gear	180	65	75	28.920

MAXIMUM POWER WITHOUT BALLAST

64.99	6815	3.58	2203	11.30	4th Gear Hydra-Power	182	75	85	28.830
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST

4th Gear Hydra-Power									
Pounds pull		7042	7378	7541	7580	7628	7658	7415	
Horsepower		69.52	65.22	58.80	51.75	44.61	37.03	29.03	
Crankshaft speed rpm		2201	1982	1750	1534	1316	1089	879	
Miles per hour		3.70	3.31	2.92	2.56	2.19	1.81	1.47	
Slip of drivers %		7.53	8.14	8.27	8.27	8.40	8.40	8.27	

TIRES, BALLAST and WEIGHT

		With Ballast		Without Ballast	
Rear tires	—No, size, ply & psi	Two 18.4-34; 8; 20		Two 18.4-34; 8; 16	
Ballast	—Liquid	1170 lb each		None	
	Cast iron	1350 lb each		None	
Front tires	—No, size, ply & psi	Two 7.50-15; 8; 40		Two 7.50-15; 8; 32	
Ballast	—Liquid	None		None	
	Cast iron	208 lb each		None	
Height of drawbar		20½ inches		21 inches	
Static weight	—Rear	11300 lb		6260 lb	
	—Front	2960 lb		2545 lb	
Total weight with operator		14435 lb		8980 lb	

Department of Agricultural Engineering

Dates of Test: May 22 to June 4, 1963

Manufacturer: OLIVER CORPORATION,
CHARLES CITY, IOWA

Manufacturer's Power Rating: Not rated

FUEL, OIL and TIME Fuel regular gasoline Octane No Motor 84.4 Research 92.2 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7365 Weight per gallon 6.131 lb Oil SAE 10W API service classification MS DM To motor 1.977 gal Drained from motor 1.596 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 43 hours.

ENGINE Make Oliver gasoline Type 6 cylinder vertical Serial No 221120 Crankshaft mounted lengthwise Rated rpm 2200 Bore and stroke 3⅞" x 4" Compression ratio 8.5 to 1 Displacement 283 cu in Carburetor size 1½" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner oil washed wire screen Oil filter full flow replaceable paper element Oil cooler engine coolant heat exchanger for Hydra-Power oil Fuel filter screen in sediment bowl Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 124925844 Tread width rear 68" to 89½" front 60" to 84" Wheel base 109¼" Center of gravity (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 30.9" Vertical distance above roadway 35.5" Horizontal distance from center of rear wheel tread 0" to the right/left Hydraulic control system direct engine drive Transmission selective gear fixed ratio with partial range operator controlled power shifting Advertised speeds mph first 1.60 second 3.09 third 4.31 fourth 5.34 fifth 8.32 sixth 14.37 reverse 1.81 and 4.87 (using Hydra-Power drive) first 1.17 second 2.27 third 3.16 fourth 3.92 fifth 6.11 sixth 10.55 reverse 1.33 and 3.57 Clutch single plate dry disc operated by foot pedal Brakes double disc operated by two foot pedals which can be locked Steering mechanical with power assist Turning radius (on concrete surface with brake applied) right 152" left 152" (on concrete surface without brake) right 172" left 172" Turning space diameter (on concrete surface with brake applied) right 312" left 312" (on concrete surface without brake) right 352" left 352" Belt pulley 1056 rpm at 2200 engine rpm diam 11⅝" face 8¾" Belt speed 3111 fpm Power take-off 1004 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear and first gear Hydra-Power drive were not run as it was necessary to limit the pull in second gear Hydra-Power drive to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 839.

L. F. LARSEN
Engineer-in-Charge

L. W. HURLBUT, Chairman
G. W. STEINBRUEGGE
J. J. SULEK
Board of Tractor Test
Engineers

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, $\frac{1}{2}$ the 85% torque; maximum power, $\frac{1}{4}$ and $\frac{3}{4}$ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic trans-

mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Power Without Ballast. All added ballast is removed from the tractor. The maximum drawbar power of the tractor is determined by the same procedure used for getting maximum power with ballast. The gear (or travel speed) is the same as that used in the 10-hour test.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the Nebraska Tractor Tests write to the Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.



Oliver 1800 Series B Gasoline