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Test 846: Oliver 1800 4WD

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 846-OLIVER 1800 SERIES B FOUR - WHEEL DRIVE 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									
80.72	2200	6.565	0.505	12.30	172	64	75	29.080	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
71.48	2292	6.210	0.539	11.51	170	64	75	.....
0.00	2444	2.355	.....	.....	166	64	74	.....
37.12	2380	4.333	0.724	8.57	169	64	75	.....
80.85	2200	6.558	0.503	12.33	172	64	75	.....
18.90	2424	3.356	1.102	5.63	167	63	75	.....
54.55	2333	5.305	0.603	10.28	169	64	75	.....
Av	43.82	2345	4.686	0.663	9.35	169	64	75	29.100

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption			Temp Degrees F			Barometer inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear Hydra-Power											
68.40	6700	3.83	2205	4.95	6.544	0.593	10.45	178	56	60	29.030
75% of Pull at Maximum Power—Ten Hours—4th Gear Hydra-Power											
54.98	5079	4.06	2304	3.50	5.593	0.631	9.83	178	59	65	28.929
50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power											
38.17	3414	4.19	2356	2.48	4.948	0.804	7.71	180	70	71	29.060
MAXIMUM POWER WITH BALLAST											
55.16	14155	1.46	2293	14.67	1st Gear		174	55	60		29.155
66.76	12059	2.08	2204	10.74	2nd Gear Hydra-Power		176	56	62		29.155
67.85	8588	2.96	2204	6.64	2nd Gear		178	56	62		29.150
68.54	8465	3.04	2204	6.57	3rd Gear Hydra-Power		178	57	63		29.085
69.52	6814	3.83	2207	5.02	4th Gear Hydra-Power		178	57	63		29.085
68.06	6028	4.23	2203	4.37	3rd Gear		178	57	63		29.080
67.59	4804	5.28	2197	3.49	4th Gear		180	57	63		29.080
68.90	4272	6.05	2196	3.04	5th Gear Hydra-Power		178	57	63		29.065
65.49	2941	8.35	2201	2.14	5th Gear		178	57	63		29.050
61.94	2175	10.68	2209	1.68	6th Gear Hydra-Power		178	56	62		29.050
54.23	1387	14.66	2209	0.52	6th Gear		178	56	62		29.050
MAXIMUM POWER WITHOUT BALLAST											
63.39	6299	3.77	2203	7.13	4th Gear Hydra-Power		177	75	89		28.840

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 4th Gear Hydra-Power

Pounds pull	6814	7122	7257	7243	7410	7387	7244
Horsepower	69.52	64.96	58.58	51.07	44.73	37.11	29.28
Crankshaft speed rpm	2207	1979	1754	1533	1314	1095	879
Miles per hour	3.83	3.42	3.03	2.64	2.26	1.88	1.52
Slip of drivers %	5.02	5.30	5.59	5.59	5.45	5.73	5.59

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
	—Liquid	880 lb each	None
	—Cast iron	1650 lb each	None
Front tires	—No, size, ply & psi	Two 13.6-24; 8; 28	Two 13.6-24; 8; 28
	—Liquid	515 lb each	None
	—Cast iron	755 lb each	None
Height of drawbar		10 inches	11 inches
Static weight	—Rear	10800 lb	5740 lb
	—Front	6780 lb	4240 lb
Total weight with operator		17755 lb	10155 lb

Department of Agricultural Engineering

Dates of Test: September 10 to September 19, 1963

Manufacturer: OLIVER CORPORATION,
CHARLES CITY, IOWA

Manufacturer's Power Rating: Not rated

FUEL, OIL and TIME Fuel regular gasoline Octane No Motor 84.0 Research 92.8 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7451 Weight per gallon 6.203 lb Oil SAE 10W API service classification MS, DM To motor 1.721 gal Drained from motor 1.541 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 40½ hours.

ENGINE Make Oliver gasoline Type 6 cylinder vertical Serial No 42621 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 4-wheel drive Serial No 133283848 Tread width rear 68" to 89½" front 66" or 70¾" Wheel base 86¾" 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 36.7" Vertical distance above roadway 31.5" 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 hydraulic with power assist Turning radius (on concrete surface with brake applied) right 161" left 161" (on concrete surface without brake) right 241" left 241" Turning space diameter (on concrete surface with brake applied) right 337" left 337" (on concrete surface without brake) right 496" left 496" Belt pulley 1056 rpm at 2200 engine rpm diam 11⅝/16" face 8¾" Belt speed 3111 fpm Power take-off 1004 rpm at 2200 engine rpm.

REPAIRS and ADJUSTMENTS During preliminary power take-off runs it was necessary to replace the governor thrust washer and governor shaft assembly due to the failure of thrust washer.

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

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

We, the undersigned, certify that this is a true and correct report of official Tractor Test 846.

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 Four-Wheel Drive Gasoline