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Test 832: Oliver 1800 Diesel 4WD

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 832-OLIVER 1800 SERIES B FOUR-WHEEL DRIVE DIESEL

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								
76.97	2200	5.520	0.498	13.94	187	56	75	29.013
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
68.16	2293	5.162	0.526	13.20	182	57	78	.....
0.00	2374	1.754	.....	.....	148	55	75	.....
34.85	2343	3.369	0.671	10.34	162	55	73	.....
76.62	2200	5.495	0.498	13.94	185	56	76	.....
17.56	2361	2.527	0.999	6.95	158	54	73	.....
51.75	2321	4.294	0.576	12.05	175	54	73	.....
Av 41.49	2315	3.767	0.631	11.01	168	55	74	28.945

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		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											
64.00	6282	3.82	2202	4.70	5.493	0.596	11.65	182	38	40	28.575
61.56	6173	3.74	2201	6.56	5.363	0.605	11.48	(front whl dr disengaged)			
75% of Pull at Maximum Power—Ten Hours & Two Hours—4th Gear Hydra-Power											
52.35	4803	4.09	2320	3.23	4.785	0.635	10.94	176	46	47	29.042
50.45	4707	4.02	2316	4.59	4.725	0.650	10.68	(front whl dr disengaged)			
50% of Pull at Maximum Power—Two Hours—4th Gear Hydra-Power											
36.01	3236	4.17	2345	2.34	3.837	0.740	9.38	177	45	46	29.038
35.11	3193	4.12	2342	3.24	3.762	0.744	9.33	(front whl dr disengaged)			

MAXIMUM POWER WITH BALLAST

54.27	14036	1.45	2290	14.85	1st Gear	163	42	48	28.535
61.51	10990	2.10	2202	9.52	2nd Gear Hydra-Power	170	47	56	28.400
62.59	7941	2.96	2200	6.53	2nd Gear	185	48	56	28.395
62.84	7772	3.03	2198	6.26	3rd Gear Hydra-Power	186	48	56	28.395
64.04	6288	3.82	2198	4.70	4th Gear Hydra-Power	183	44	49	28.580
61.60	5435	4.25	2197	3.39	3rd Gear	182	52	58	29.100
62.78	4448	5.29	2203	3.24	4th Gear	182	45	52	28.600
63.21	3897	6.08	2206	2.65	5th Gear Hydra-Power	183	45	52	28.590
60.27	2713	8.33	2199	1.89	5th Gear	183	45	52	28.590
56.94	2018	10.58	2199	1.81	6th Gear Hydra-Power	180	45	51	28.610
47.66	1230	14.53	2199	0.83	6th Gear	180	45	51	28.610
(front wheel drive disengaged)									
57.49	10551	2.04	2278	14.71	2nd Gear Hydra-Power	170	47	56	28.400
61.36	7864	2.93	2202	9.60	3rd Gear Hydra-Power	189	48	56	28.395
62.36	6276	3.73	2202	7.00	4th Gear Hydra-Power	182	44	49	28.600
62.67	3938	5.97	2197	4.04	5th Gear Hydra-Power	183	45	52	28.590
55.91	1989	10.54	2200	1.96	6th Gear Hydra-Power	183	45	51	28.610

MAXIMUM POWER WITHOUT BALLAST

62.74	6203	3.79	2196	5.64	4th Gear Hydra-Power		180	51	56	29.070
58.55	6134	3.58	2198	10.92	4th Gear Hydra-Pwr (front whl dr disengaged)					

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST

4th Gear Hydra-Power						
Pounds pull	6288	7162	7483	7706	7633	7514
Horsepower	64.04	65.37	60.50	54.20	45.91	37.93
Miles per hour	3.82	3.42	3.03	2.64	2.26	1.89
Slip of drivers, %	4.70	5.13	5.41	5.70	5.70	5.56

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	601 lb each	None
	Cast iron	1950 lb each	None
Front tires	—No, size, ply & psi	Two 13.6-24; 6; 20	Two 13.6-24; 6; 14
	—Liquid	None	None
	Cast iron	612 lb each	None
Height of drawbar		10 inches	10½ inches
	Static weight	11252 lb	6150 lb
	—Rear	5575 lb	4350 lb
Total weight with operator	Front	17002 lb	10675 lb

Department of Agricultural Engineering
Dates of Test: November 16 to December 1, 1962
Manufacturer: OLIVER CORPORATION,
CHARLES CITY, IOWA
Manufacturers Power Rating: Not rated

FUEL, OIL and TIME Fuel No. 2 Diesel Cetane No 54.2 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8341 Weight per gallon 6.945 lb Oil SAE 10W API service classification DS To motor 2.503 gal Drained from motor 1.851 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 63½ hours.

ENGINE Make Oliver Diesel Type 6 cylinder vertical Serial No 30926 Crankshaft mounted lengthwise Rated rpm 2200 Bore and stroke 3⅞" x 4¾" Compression ratio 16.25 to 1 Displacement 310 cu in Cranking system 12 volt electric (two 6-volt batteries) Lubrication pressure Air cleaner oil washed wire mesh Oil filter full flow replaceable paper element Oil cooler engine coolant heat exchanger for Hydra-Power oil Fuel filter primary filter with replaceable cotton element and secondary filter with replaceable pleated paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type 4-wheel drive Serial No 124924-844 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 11 5/16" face 8 3/4" 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 Hydra-Power drive was not run as it was necessary to limit the pull in first gear direct drive (four-wheel drive) and second gear Hydra-Power drive (front wheel drive disengaged) to avoid excessive wheel slippage. The direct drive gears with the front wheel drive disengaged are not reported because of space limitation.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 832.

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-

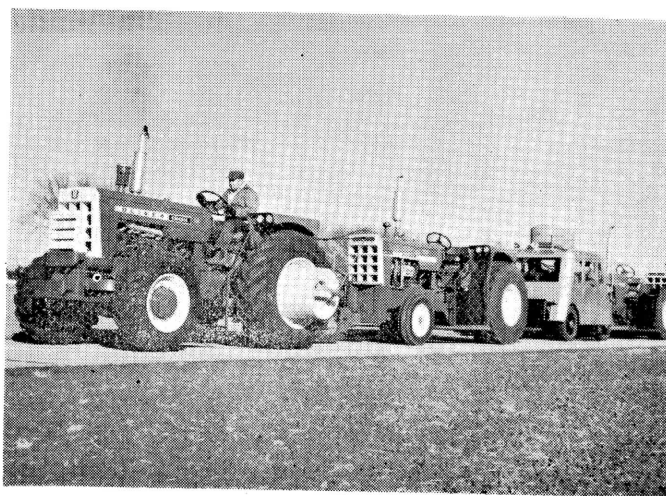
mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the 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 Diesel