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Test 962: Oliver 1750 Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 962 - OLIVER 1750 DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption		Temperature Degrees F				
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
80.05	2400	5.426	0.473	14.75	176	64	75	28.967
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
70.12	2470	4.711	0.468	14.88	175	64	75	.....
0.00	2551	1.678	.....	.....	150	64	75	.....
35.63	2518	2.994	0.586	11.90	168	63	76	.....
79.97	2399	5.417	0.472	14.76	178	64	77	.....
18.08	2538	2.254	0.869	8.02	168	63	75	.....
53.10	2497	3.734	0.490	14.22	170	63	73	.....
Av 42.82	2495	3.465	0.564	12.36	168	63	75	28.967

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	Cooling med	Air wet bulb	Air dry bulb	

VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—6th Gear (4th Hydra-Pwr)											
65.28	6637	3.69	2402	7.43	5.342	0.571	12.22	176	74	83	28.735
75% of Pull at Maximum Power—Ten Hours—6th Gear (4th Hydra-Pwr)											
54.12	5230	3.88	2485	5.85	4.359	0.569	12.42	164	70	72	28.652
50% of Pull at Maximum Power—Two Hours—6th Gear (4th Hydra-Pwr)											
38.80	3620	4.02	2514	3.70	3.462	0.622	11.21	168	64	67	28.730

MAXIMUM POWER WITH BALLAST

53.86	9929	2.03	2490	14.92	3rd Gear (2nd Hy-Pwr)			169	53	59	29.220
65.39	8833	2.78	2401	11.62	4th Gear (2nd Dir-Dr)			162	67	72	28.830
65.84	8619	2.86	2401	10.94	5th Gear (3rd Hy-Pwr)			168	67	72	28.830
68.09	6967	3.66	2404	7.93	6th Gear (4th Hy-Pwr)			163	69	77	28.830
66.63	6111	4.09	2404	6.92	7th Gear (3rd Dir-Dr)			171	69	77	28.830
68.11	4966	5.14	2399	5.13	8th Gear (4th Dir-Dr)			173	71	78	28.770
68.37	4327	5.93	2398	4.42	9th Gear (5th Hy-Pwr)			170	70	78	28.745
66.36	3033	8.20	2403	2.97	10th Gear (5th Dir-Dr)			172	72	80	28.740
66.05	2362	10.49	2405	2.26	11th Gear (6th Hy-Pwr)			172	73	80	28.725
60.14	1562	14.44	2412	1.43	12th Gear (6th Dir-Dr)			174	73	80	28.720

MAXIMUM PULL WITHOUT BALLAST

61.30	8147	2.82	2452	14.75	5th Gear (3rd Hy-Pwr)			172	67	72	28.620
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—6th Gear (4th Hydra-Pwr)

Pounds pull	6967	7125	7429	7667	7673	7815	7438
Horsepower	68.09	62.48	57.20	51.69	44.25	37.63	29.10
Crankshaft speed, rpm	2404	2161	1908	1678	1439	1203	972
Miles per hour	3.66	3.29	2.89	2.53	2.16	1.81	1.47
Slip of drivers %	7.93	8.19	8.72	9.24	9.36	9.49	8.98

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-34; 6; 16	Two 18.4-34; 6; 16
	—Liquid	990 lb each	None
	Cast iron	250 lb each	None
Front tire	—No, size, ply & psi	Two 7.50-15; 8; 36	Two 7.50-15; 8; 32
	—Liquid	None	None
	Cast iron	23 lb each	None
Height of drawbar		20½ inches	21 inches
Static weight with operator—Rear		9850 lb	7370 lb
	Front	2665 lb	2620 lb
	Total	12515 lb	9990 lb

Department of Agricultural Engineering

Dates of Test: May 22 to June 12, 1967

Manufacturer: OLIVER CORPORATION,
CHARLES CITY, IOWA

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 54.7 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8374 Weight per gallon 6.973 lb Oil SAE 20-20W API service classification DS To motor 1.951 gal Drained from motor 1.667 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 48½ hours.

ENGINE Make Oliver Diesel Type 6 cylinder vertical Serial No 127893 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 3⅞ x 4¾" Compression ratio 16.0 to 1 Displacement 310 cu in Cranking system 12 volt electric (two 6 volt batteries) Lubrication pressure Air cleaner dry type with built-in precleaner and automatic unloader Oil filter full flow replaceable paper element Oil cooler engine coolant heat exchanger for Hydra-Power oil and radiator for hydraulic oil Fuel filter primary filter with replaceable cotton element, secondary filter with replaceable pleated paper element and water trap in main fuel tank Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type Standard Serial No 185765-427 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 31.2" Vertical distance above roadway 35.3" 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 1.18 second 1.61 third 2.28 fourth 3.10 fifth 3.18 sixth 3.94 seventh 4.34 eighth 5.37 ninth 6.13 tenth 8.36 eleventh 10.60, twelfth 14.45 reverse 1.82 and 4.89 Clutch single plate dry disc Brakes double disc operated by two foot pedals that can be locked Steering hydraulic with power assist Turning radius (on concrete surface with brake applied) right 155" left 155" (on concrete surface without brake) right 170" left 170" Turning space diameter (on concrete surface with brake applied) right 310" left 310" (on concrete surface without brake) right 350" left 350" Belt pulley 1035 rpm at 2400 engine rpm diam 11⅝" face 8¾" Belt speed 3049 fpm Power take-off 984 rpm at 2400 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 and second gears were not run as it was necessary to limit the pull in third gear to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 962.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

J. J. SULEK

D. E. LANE

Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

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, $\frac{1}{2}$ of 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 transmission, 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 Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

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 1750 DIESEL