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January 1970

Test 1057: Oliver 1755 Diesel

Nebraska Tractor Test Lab

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NEBRASKA TRACTOR TEST 1057 - OLIVER 1755 DIESEL (ALSO MINNEAPOLIS-MOLINE G850 DIESEL)

POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—984 rpm)								
86.93	2400	6.687	0.530	13.00	193	57	75	29.343
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
77.10	2509	5.377	0.481	14.34	185	56	75	.....
0.00	2616	1.741	.....	.....	168	56	74	.....
39.61	2570	3.387	0.589	11.69	173	55	74	.....
86.92	2400	6.700	0.531	12.97	192	57	76	.....
19.98	2590	2.708	0.934	7.38	170	56	75	.....
58.44	2538	4.288	0.506	13.63	177	56	75	.....
Av 47.01	2537	4.034	0.591	11.65	178	56	75	29.320

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
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VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST

Maximum Available Power—Two Hours—8th Gear (3rd Direct)											
73.87	6805	4.07	2401	8.61	6.633	0.619	11.14	177	51	61	29.040
75% of Pull at Maximum Power—Ten Hours—8th Gear (3rd Direct)											
61.58	5293	4.36	2510	6.19	5.109	0.572	12.05	168	57	63	28.724
50% of Pull at Maximum Power—Two Hours—8th Gear (3rd Direct)											
42.60	3529	4.53	2546	4.05	4.655	0.753	9.15	162	49	54	29.130

MAXIMUM POWER WITH BALLAST

65.05	10549	2.31	2468	14.83	4th Gear (2nd Under)	160	44	48	28.850
73.63	8358	3.30	2406	10.66	6th Gear (3rd Under)	169	52	60	29.090
76.38	7068	4.05	2397	8.74	8th Gear (3rd Direct)	172	52	62	29.090
73.42	6545	4.21	2401	7.89	9th Gear (4th Under)	171	52	62	29.090
74.28	5599	4.98	2398	6.54	10th Gear (3rd Over)	172	52	64	29.090
75.45	5505	5.14	2397	6.47	11th Gear (4th Direct)	173	52	64	29.090
74.27	4466	6.24	2396	5.29	12th Gear (4th Over)	171	51	61	29.090
75.05	3413	8.25	2406	4.01	14th Gear (5th Direct)	172	52	64	29.090

MAXIMUM PULL WITHOUT BALLAST

67.67	7902	3.21	2457	14.92	6th Gear (3rd Under)	172	39	42	28.930
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VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 8th Gear (3rd Direct)

Pounds Pull	7068	7586	7667	7794	7601	7637
Horsepower	76.38	73.49	65.38	58.43	48.78	40.85
Crankshaft Speed rpm	2397	2166	1912	1686	1436	1200
Miles Per Hour	4.05	3.63	3.20	2.81	2.41	2.01
Slip of Drivers %	8.74	9.52	9.77	10.03	9.90	9.90

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18.4-34; 8; 18	Two 18.4-34; 8; 16
Ballast	—Liquid	715 lb each	None
	Cast iron	980 lb each	None
Front tires	—No, size, ply & psi	Two 7.5L-15; 8; 40	Two 7.5L-15; 8; 40
Ballast	—Liquid	None	None
	Cast iron	85 lb each	None
Height of drawbar		20 1/2 inches	21 1/2 inches
Static weight with operator—Rear		10420 lb	7030 lb
	Front	2830 lb	2660 lb
	Total	13250 lb	9690 lb

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

Department of Agricultural Engineering

Dates of Test: October 14 to October 27, 1970

Manufacturer: WHITE FARM EQUIPMENT
COMPANY, HOPKINS, MINNESOTA

FUEL, OIL and TIME Fuel No 2 Diesel Cetane 53.5 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8276 Weight per gallon 6.891 lb Oil SAE 30 API service classification MS, DS To motor 2.123 gal Drained from motor 1.435 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 45 1/2 hours.

ENGINE Make Oliver Diesel Type 6 cylinder vertical Serial No 186669 Crankshaft mounted lengthwise Rated rpm 2400 Bore and stroke 3 7/8" x 4 3/8" Compression ratio 16 to 1 Displacement 310 cu in Cranking system 12 volt electric Lubrication pressure Air cleaner two stage dry type with pre-cleaner and automatic dust un-loader Oil filter full flow replaceable cotton element Oil cooler radiator hydra-power oil Fuel filter primary filter with replaceable cotton element secondary filter with replaceable pleated paper element Muffler was used Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 221723676 Tread width rear 68" to 89 1/2" front 60" to 84" Wheel base 109 1/4" 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 (3) range operator controlled power shifting Advertised speeds mph first 1.3 second 1.6 third 1.9 fourth 2.6 fifth 3.1 sixth 3.6 seventh 3.7 eighth 4.3 ninth 4.4 tenth 5.2 eleventh 5.3 twelfth 6.4 thirteenth 6.9 fourteenth 8.3 fifteenth 10.0 sixteenth 11.9 seventeenth 14.4 eighteenth 17.2 reverse 1.5, 1.8, 2.2, 4.0, 4.9 and 5.8 Clutch single plate dry disc with cerametallic buttons and operated by foot pedal Brakes double dry disc hydraulically power actuated operated by two foot pedals that can be locked together Steering hydrostatic power 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 11 1/2" face 8 3/4" 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, second, and third gears were not run as it was necessary to limit the pull in fourth gear to avoid excessive wheel slippage. Fifth, seventh, thirteenth, fifteenth, sixteenth, seventeenth and eighteenth gears were not run as test procedure requires only eight gears.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 1057.

L. F. LARSEN

Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman

W. E. SPLINTER

D. E. LANE

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. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

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.

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-

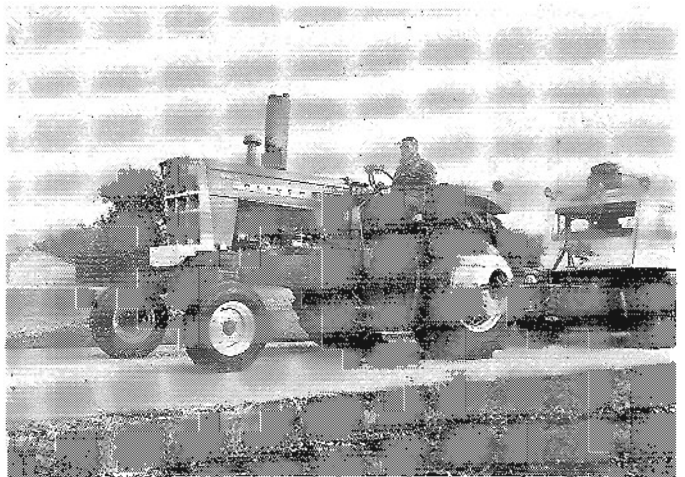
mission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the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

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 8 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 manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. 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 Drawbar Pull 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 68503.



OLIVER 1755 DIESEL