10-4-1960

Test 767: Oliver 1800 Diesel

Nebraska Tractor Test Lab
University of Nebraska-Lincoln, tractortestlab@unl.edu

NEBRASKA TRACTOR TEST 767 - OLIVER 1800 DIESEL

The University of Nebraska Agricultural Experiment Station

E. F. Frolik, Dean and Acting Director, Lincoln, Nebraska

POWER TAKE-OFF PERFORMANCE

Hp	Crank shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Temp Degrees F Air wet bulb	Temp Degrees F Air dry bulb	Barometer inches of mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
70.15	2000	4.946	0.501	14.18	167	58	75	29.087
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
62.14	2084	4.377	0.500	14.20	154	57	75	.....
0.00	2191	1.436	....	....	125	55	72	.....
31.77	2132	2.822	0.631	11.26	127	57	75	.....
70.32	2000	4.909	0.496	14.32	167	58	76	.....
16.09	2160	2.041	0.901	7.88	130	57	75	.....
47.10	2106	3.557	0.536	13.24	134	57	76	.....
Av 37.90	**2112**	**3.190**	**0.598**	**11.88**	**139**	**57**	**75**	**29.115**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	Slip of drivers %	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Temperature Degrees F Air wet bulb	Temperature Degrees F Air drv bulb	Barometer inches of mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
62.55	4472	5.25	2002	4.33	4.758	0.540	13.15	181	65	70	28.948
75% of Pull at Maximum Power—Ten Hours—4th Gear											
49.01	3340	5.50	2077	3.12	3.988	0.578	12.29	174	69	77	28.970
50% of Pull at Maximum Power—Two Hours—4th Gear											
33.74	2232	5.67	2114	2.06	3.268	0.688	10.32	165	58	59	28.930
MAXIMUM POWER WITH BALLAST											
43.36	11040	1.47	2093	14.27	1st Gear.....			165	53	55	29.000
60.93	7922	2.88	2002	9.15	2nd Gear.....			172	53	55	29.000
60.86	5495	4.15	2000	6.11	3rd Gear.....			174	61	65	29.020
61.80	4448	5.21	2001	4.83	4th Gear.....			177	61	65	29.020
59.61	2697	8.29	2001	2.70	5th Gear.....			179	63	68	29.020
52.28	1344	14.59	2008	1.26	6th Gear.....			174	65	72	29.020
MAXIMUM POWER WITHOUT BALLAST											
61.64	4491	5.15	1995	6.42	4th Gear.....			174	64	70	28.740

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear					
Pounds pull	4450	4800	5000	4950	4650	4300
Horsepower	61.8	60.2	56.0	47.5	38.4	29.8
Miles per hour	5.2	4.7	4.2	3.6	3.1	2.6

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	840 lb each	None
	—Cast iron	1800 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-15;6;36	Two 7.50-15;6;28
Ballast	—Liquid	None	None
	—Cast iron	240 lb each	None
Height of drawbar		21 inches	22 inches
Static weight	—Rear	11,250 lb	5970 lb
	—Front	2,920 lb	2440 lb
Total weight with operator		14,345 lb	8585 lb

Department of Agricultural Engineering
Dates of Test: October 4 to October 12, 1960
Manufacturer: THE OLIVER CORPORATION, CHARLES CITY, IOWA
Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel **Cetane No 47** (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.8528 **Weight per gallon** 7.101 lb **Oil** SAE 10 **API service classification** DS **To motor** 1.531 gal **Drained from motor** 1.301 gal **Transmission and final-drive lubricant** SAE 10W-30 engine oil with Oliver special oil additive **Total time engine was operated** 40 hours.

ENGINE Make Oliver Diesel **Type** 6 cylinder vertical **Serial No** 111582 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Bore and stroke** 3⅞" x 4" **Compression ratio** 16.0 to 1 **Displacement** 283 cu in **Cranking system** 12 volt electric (two 6 volt batteries) **Lubrication** pressure **Air cleaner** oil washed wire mesh with centrifugal precleaner **Oil filter** two replaceable paper elements **Fuel filter** primary filter with cotton waste replaceable element and secondary filter with replaceable paper element **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS Type tricycle **Serial No** 90528-886 **Tread width rear** 68" to 89½" front 9¼" to 14½" **Wheel base** 103" **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 **Advertised speeds mph** first 1.59 second 3.07 third 4.29 fourth 5.31 fifth 8.27 sixth 14.30 reverse 1.80 and 4.84 **Clutch** single plate operated by foot pedal **Brakes** double disc operated by foot pedals which can be locked **Steering** power assisted **Turning radius** (on concrete surface with brake applied) right 115" left 115" (on concrete surface without brake) right 124" left 124" **Turning space diameter** (on concrete surface with brake applied) right 237" left 237" (on concrete surface without brake) right 256" left 256" **Belt pulley** 1053 rpm at 2000 engine rpm diam 11⁵/₁₆" face 8¾" **Belt speed** 3100 fpm **Power take-off** 1000 rpm at 2000 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.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 767.

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, ½ the 85% torque; maximum power; ¼ and ¾ 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 transmissions, 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 Diesel