

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

5-13-1959

Test 698: Oliver 550 Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, tractortestlab@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/tractormuseumlit>



Part of the [Energy Systems Commons](#), [History of Science, Technology, and Medicine Commons](#), [Other Mechanical Engineering Commons](#), [Physical Sciences and Mathematics Commons](#), [Science and Mathematics Education Commons](#), and the [United States History Commons](#)

Nebraska Tractor Test Lab, "Test 698: Oliver 550 Diesel" (1959). *Nebraska Tractor Tests*. 544.
<https://digitalcommons.unl.edu/tractormuseumlit/544>

This Article is brought to you for free and open access by the Tractor Test and Power Museum, The Lester F. Larsen at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Nebraska Tractor Tests by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NEBRASKA TRACTOR TEST 698 – OLIVER 550 DIESEL

University of Nebraska Agricultural Experiment Station

W. V. Lambert, Director, Lincoln, Nebraska

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								
39.21	2000	2.811	0.503	13.95	183	60	75	28.877
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
35.05	2102	2.577	0.515	13.60	173	60	75	.....
2.29	2217	0.912	2.790	2.51	141	60	75	.....
17.82	2138	1.588	0.625	11.22	160	61	75	.....
39.22	2001	2.842	0.508	13.80	186	62	75	.....
9.09	2181	1.220	0.941	7.45	145	62	75	.....
26.41	2113	2.050	0.544	12.88	169	63	75	.....
Av	21.65	2125	1.865	0.604	11.61	61	75	28.850

DRAWBAR PERFORMANCE

Hp	Draw- bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	Fuel Consumption Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool- Air Air ing wet dry med bulb bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER & FUEL CONSUMPTION WITH BALLAST									
Maximum Available Power—Two Hours—4th Gear									
35.09	2643	4.98	1999	6.25	2.806	0.560	12.51	183 54 61	29.210
75% of Pull at Maximum Power—Ten Hours—4th Gear									
28.33	2006	5.30	20.75	3.89	2.389	0.591	11.86	174 71 79	28.725
50% of Pull at Maximum Power—Two Hours—4th Gear									
20.91	1435	5.46	2122	2.96	1.948	0.653	10.73	156 57 64	29.195
MAXIMUM POWER WITH BALLAST									
31.40	5110	2.30	2095	14.62	2nd Gear	.....	165	53 59	29.235
35.04	3630	3.62	2002	9.43	3rd Gear	.....	166	51 55	29.225
35.36	2676	4.96	1998	6.65	4th Gear	.....	165	53 58	29.250
35.37	1914	6.93	1995	4.40	5th Gear	.....	172	53 58	29.250
31.48	800	14.76	2003	1.52	6th Gear	.....	176	53 58	29.250
MAXIMUM POWER WITHOUT BALLAST									
30.98	2424	4.79	2024	14.03	4th Gear	.....	179	66 74	28.600
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear									
Pounds pull			2700	2900	3000	2900	2900	2650	
Horsepower			35.4	34.8	31.2	26.3	23.2	17.7	
Miles per hour			5.0	4.5	3.9	3.4	3.0	2.5	

TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 12-26;4;14	Two 12-26;4;12
Ballast	—Liquid	423 lb each	None
	—Cast iron	880 lb each	None
Front tires	—No, Size, ply & psi	Two 6.00-16;4;32	Two 6.00-16;4;32
Ballast	—Liquid	69 lb each	None
	—Cast iron	181 lb each	None
Height of drawbar		22 inches	23½ inches
Static weight	—Rear	4690 lb	2085 lb
	—Front	1970 lb	1470 lb
Total weight with operator		6835 lb	3730 lb

Department of Agricultural Engineering

Dates of Test: May 13 to May 26, 1959

Manufacturer: THE OLIVER CORP.,
CHARLES CITY, IOWA

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel No 2 Diesel Cetane No 51 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.8418 Weight per gallon 7.009 lb Oil SAE 10W-20 API service classification DS To motor 1.158 gal Drained from motor 0.700 gal Transmission and final-drive lubricant SAE No 10W Type EP Total time motor was operated 45 hours.

ENGINE Make Oliver Diesel Type 4 cylinder vertical Serial No 1081794 Crankshaft mounted lengthwise Rated rpm 2000 Lubrication pressure Bore and stroke 3⅞" x 3¾" Compression ratio 16 to 1 Displacement 155 cu in Cranking system 12 volts (two-6 volt batteries) Air cleaner oil bath wire screen Muffler was used Oil filter replaceable pleated paper cartridge Fuel filter one sediment bowl with metal edge type strainer, one replaceable treated paper element and one replaceable treated paper sealed filter Cooling medium temperature control thermostat.

CHASSIS Type standard Serial No 73-458-519 Tread width rear 48" to 76" front 48" to 76" Wheel base 73½" 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 30¼" Vertical distance above roadway 23⅞" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 1.92 second 2.55 third 3.95 fourth 5.27 fifth 7.21 sixth 14.88 reverse 2.00 and 4.12 Clutch single plate dry disc operated by foot pedal Brakes double disc operated by two foot pedals Power take-off 1000 rpm at 2000 engine rpm Steering power assisted Turning radius (on concrete surface with brake applied) right 125" left 125" (on concrete surface without brake) right 140" left 140" Turning space diameter (on concrete surface with brake applied) right 266" left 266" (on concrete surface without brake) right 296" left 296".

REPAIRS AND ADJUSTMENTS No repairs or adjustments.

REMARKS All test results were determined from observed data obtained in accordance with SAE and ASAE test code. The first gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No 698.

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 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 550 Diesel Test 698