

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Nebraska Tractor Tests

Tractor Test and Power Museum, The Lester F. Larsen

---

11-13-1967

## Test 969: Oliver 1950-T Diesel

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto: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 969: Oliver 1950-T Diesel" (1967). *Nebraska Tractor Tests*. 568.  
<https://digitalcommons.unl.edu/tractormuseumlit/568>

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 969 – OLIVER 1950-T DIESEL ROW CROP

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Temperature Degrees F					Barometer inches of Mercury
		Gal per hr	Lb per hp-hr	Hp-hr per gal	Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
105.24	2400	6.496	0.428	16.20	181	56	75	29.097	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
96.14	2578	6.332	0.457	15.18	178	56	76	.....	
0.00	2672	2.118	.....	.....	165	55	73	.....	
49.07	2633	4.201	0.594	11.68	170	55	74	.....	
105.19	2401	6.483	0.428	16.23	181	55	75	.....	
24.61	2653	3.134	0.884	7.85	167	55	74	.....	
72.83	2609	5.256	0.501	13.86	165	56	75	.....	
Av	59.97	2591	4.587	0.549	12.64	171	55	74	29.117

## DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank- shaft speed rpm	Slip of drivers %	Fuel Consumption			Temp Degrees F			Barom- eter inches of Mercury
					Gal per hr	Lb per hp-hr	Hp-hr per gal	Cool- ing med	Air wet bulb	Air dry bulb	
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear Under drive											
90.07	7047	4.79	2402	4.77	6.349	0.489	14.19	172	52	60	28.830
75% of Pull at Maximum Power—Ten Hours—4th Gear Under drive											
75.77	5476	5.19	2573	3.61	5.955	0.545	12.72	165	44	52	28.984
50% of Pull at Maximum Power—Two Hours—4th Gear Under drive											
51.04	3600	5.32	2606	2.58	4.687	0.637	10.89	167	54	61	28.785
MAXIMUM POWER WITH BALLAST											
70.24	12884	2.04	2592	14.97	1st Gear Over drive			160	40	47	29.060
91.72	10837	3.17	2399	7.61	2nd Gear Direct drive			162	40	47	29.060
92.04	9651	3.58	2405	6.49	3rd Gear Under drive			162	40	47	29.070
92.06	8886	3.89	2403	5.89	2nd Gear Over drive			162	40	47	29.070
92.44	7952	4.36	2400	5.12	3rd Gear Direct drive			167	39	45	29.040
92.74	7259	4.79	2403	4.73	4th Gear Under drive			168	39	45	29.010
90.14	6393	5.29	2404	4.26	3rd Gear Over drive			168	39	45	29.010
93.47	6034	5.81	2401	4.03	4th Gear Direct drive			168	39	45	29.010
91.00	5000	6.83	2401	3.31	5th Gear Under drive			162	39	45	29.010
90.27	4096	8.26	2400	2.74	5th Gear Direct drive			170	40	49	28.830
86.21	3246	9.96	2400	2.17	5th Gear Over drive			162	40	49	28.830
84.14	2138	14.76	2403	1.42	6th Gear Direct drive			170	40	49	28.830
MAXIMUM PULL WITHOUT BALLAST											
82.32	8671	3.56	2417	14.63	2nd Gear Over drive			154	35	41	29.190
VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 4th Gear Under drive											
Pounds pull				7259	7930	8204	8375	8268	7889		
Horsepower				9274	90.55	82.81	73.83	62.39	49.77		
Crankshaft speed rpm				2403	2153	1909	1670	1428	1190		
Miles per hour				4.79	4.28	3.79	3.31	2.83	2.37		
Slip of drivers %				4.73	4.97	5.28	5.43	5.43	4.97		

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 23.1-34; 8; 16	Two 23.1-34; 8; 16
	—Liquid	1490 lb each	None
	Cast iron	940 lb each	None
Front tires	—No, size, ply & psi	Two 11.00-16; 8; 32	Two 11.00-16; 8; 32
	—Liquid	None	None
	Cast iron	230 lb each	None
Height of Drawbar		19½ inches	20½ inches
Static weight with operator—Rear		12610 lb	7750 lb
	Front	3170 lb	2710 lb
	Total	15780 lb	10460 lb

## Department of Agricultural Engineering

Dates of Test: November 13 to November 18, 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° 0.8336 **Weight per gallon** 6.941 lb **Oil SAE 30 API service classification** DS **To motor** 2.329 gal **Drained from motor** 1.771 gal **Transmission and final-drive lubricant** SAE 80 **Total time engine was operated** 48 hours.

**ENGINE** Make Oliver Diesel **Type** 6 cylinder vertical with turbo charger **Serial No** 141974 **Crankshaft mounted lengthwise** **Rated rpm** 2400 **Bore and stroke** 3⅞" x 4¾" **Compression ratio** 16 to 1 **Displacement** 310 cu in **Cranking system** 12 volt electric—two 12-volt batteries **Lubrication pressure** Air cleaner two dry type with precleaners and automatic unloaders **Oil filter** full flow replaceable paper element **Oil cooler** engine coolant heat exchanger for crankcase 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** Standard **Serial No** 196479603 **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 centerline of rear wheels 30.1" Vertical distance above roadway 36.4" 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 **Advised speeds mph** first under 1.48 first 1.78 first over 2.13 second under 2.73 second 3.29 second over 3.95 third under 3.66 third 4.40 third over 5.28 fourth under 4.81 fourth 5.80 fourth over 6.95 fifth under 6.77 fifth 8.15 fifth over 9.77 sixth under 11.92 sixth 14.36 sixth over 17.21 reverse 1.78, 2.15, 2.58, 4.42, 5.32 and 6.38 **Clutch** single plate dry disc operated by foot pedal **Brakes** triple disc operated by two foot pedals that can be locked together **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 **Belt speed** 3049 fpm diam 11⅝" face 8¾" **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 gear under and first gear direct were not run as it was necessary to limit the pull in first gear over to avoid excessive wheel slippage. Sixth gear over was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 969.

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

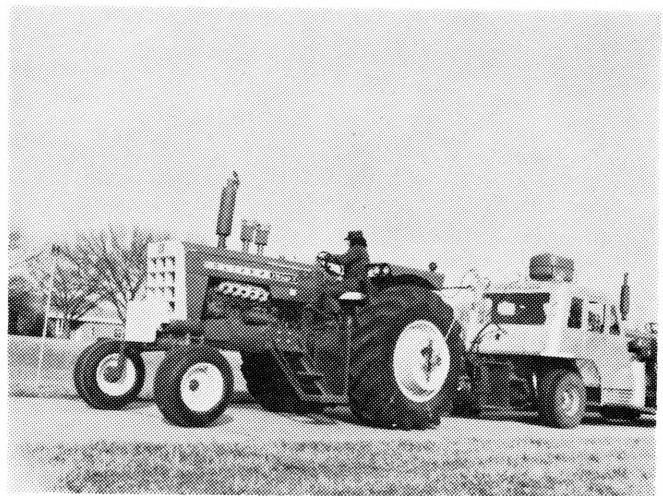
speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to 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 1950-T DIESEL ROW CROP