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## Test 874: Oliver 1650

Nebraska Tractor Test Lab

University of Nebraska-Lincoln, [tractortestlab@unl.edu](mailto:tractortestlab@unl.edu)

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# NEBRASKA TRACTOR TEST 874 - OLIVER 1650 GASOLINE

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

## POWER TAKE-OFF PERFORMANCE

Hp	Crank- shaft speed rpm	Fuel Consumption		Hp-hr per gal	Temperature Degrees F			Barometer inches of Mercury	
		Gal per hr	Lb per hp-hr		Cooling medium	Air wet bulb	Air dry bulb		
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
*	66.72	2200	5.696	0.532	11.71	181	56	76	28.753
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	59.18	2296	5.251	0.553	11.27	178	55	75	.....
	0.00	2428	1.997	.....	.....	168	55	75	.....
	30.39	2359	3.494	0.717	8.70	173	55	75	.....
	66.73	2200	5.699	0.532	11.71	180	55	76	.....
	15.41	2392	2.724	1.102	5.66	168	55	75	.....
	44.94	2325	4.370	0.606	10.28	176	56	75	.....
Av	36.11	2333	3.923	0.677	9.20	174	55	75	28.697

## DRAWBAR PERFORMANCE

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

## MAXIMUM POWER WITH BALLAST

51.90	8117	2.40	2201	14.88	2nd	Gear Hydra-Pwr	183	64	69	28.740
57.87	7614	2.85	2201	11.00	3rd	Gear Hydra-Pwr	180	32	35	29.330
58.82	6231	3.54	2203	7.91	2nd	Gear .....	180	32	35	29.330
58.55	5397	4.07	2201	6.55	3rd	Gear .....	180	32	35	29.330
59.67	4964	4.51	2204	6.08	4th	Gear Hydra-Pwr	177	31	34	29.330
59.00	3906	5.66	2203	4.87	5th	Gear Hydra-Pwr	179	32	35	29.330
57.79	3475	6.24	2199	4.25	4th	Gear .....	179	34	37	29.270
57.54	2759	7.82	2205	3.42	5th	Gear .....	182	34	37	29.270
56.27	2154	9.80	2202	2.78	6th	Gear Hydra-Pwr	181	34	37	29.270
52.41	1458	13.48	2204	2.06	6th	Gear .....	180	34	37	29.270

## MAXIMUM POWER WITHOUT BALLAST

57.70	4860	4.45	2200	6.42	4th	Gear Hydra-Pwr	180	45	50	29.000
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## VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 4th Gear Hydra-Power

Pounds pull	4964	5211	5379	5530	5647	5806	5775
Horsepower	59.67	56.04	51.20	45.97	40.16	34.54	27.41
Crankshaft speed rpm	2204	1979	1756	1536	1318	1106	881
Miles per hour	4.51	4.03	3.57	3.12	2.67	2.23	1.78
Slip of drivers %	6.08	6.22	6.48	6.75	6.88	7.27	7.14

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 15.5-38; 8; 20	Two 15.5-38; 8; 14
Ballast	—Liquid	790 lb each	None
	Cast iron	280 lb each	None
Front tires	—No, size, ply & psi	Two 6.50-16; 6; 28	Two 6.50-16; 6; 28
Ballast	—Liquid	None	None
	Cast iron	None	None
Height of drawbar		19½ inches	19½ inches
Static weight	—Rear	7520 lb	5380 lb
	Front	2080 lb	2020 lb
Total weight with operator		9775 lb	7575 lb

Department of Agricultural Engineering

Dates of Test: NOVEMBER 6 TO NOVEMBER 23, 1964

Manufacturer: OLIVER CORPORATION, CHARLES CITY, IOWA

**FUEL, OIL and TIME** Fuel regular gasoline Octane No Motor 83.4 Research 91.8 (rating taken from oil company's typical inspection data) Specific gravity converted to 60°/60° 0.7487 Weight per gallon 6.233 lb Oil SAE 10W API service classification MS, DM To motor 1.819 gal Drained from motor 1.620 gal Transmission and final-drive lubricant SAE 80 Total time engine was operated 47½ hours.

**ENGINE** Make Oliver gasoline Type 6 cylinder vertical Serial No 75822 Crankshaft mounted lengthwise Rated rpm 2200 Bore and stroke 3¾" x 4" Compression ratio 8.5 to 1 Displacement 265 cu in Carburetor size 1¼" Ignition system battery Cranking system 12 volt electric Lubrication pressure Air cleaner dry type with built in precleaner and automatic dust unloader using replaceable pleated paper element Oil filter full-flow replaceable paper element Oil cooler engine coolant heat exchanger for Hydra-Power oil and radiator for hydraulic oil Fuel filter sediment bowl with screen Muffler was used Cooling medium temperature control thermostat.

**CHASSIS** Type Standard Serial No 150 292-452 Tread width rear 56½" to 89" front 60" to 84" Wheel base 105" 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 28.2" Vertical distance above roadway 32.4" 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 Advertised speeds mph first 2.54 second 3.81 third 4.32 fourth 6.47 fifth 8.03 sixth 13.66 reverse 2.94 and 5.00 (using Hydra-Power drive) first 1.86 second 2.79 third 3.17 fourth 4.75 fifth 5.90 sixth 10.02 reverse 2.16 and 3.67 Clutch single plate dry disc operated by foot pedal 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 146" left 146" (on concrete surface without brake) right 166" left 166" Turning space diameter (on concrete surface with brake applied) right 300" left 300" (on concrete surface without brake) right 340" left 340" Belt pulley 1035 rpm at 2200 engine rpm diam 11" face 8" Belt Speed 3106 fpm Power take-off 550 or 994 rpm at 2200 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 Hydra-power drive and first gear direct drive were not run as it was necessary to limit the pull in second gear Hydra-Power drive to avoid excessive wheel slippage.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 874.

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 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. 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 1650 Gasoline