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NEBRASKA TRACTOR TEST 697 – OLIVER 550 GASOLINE

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	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 dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
	41.39	2000	3.300	0.490	12.54	173	57	75	29.075
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
	36.63	2083	3.123	0.524	11.73	167	57	73	.....
	0.41	2189	1.205	18.073	0.34	149	58	75	.....
	18.70	2125	2.103	0.691	8.89	157	58	76	.....
	40.96	2003	3.280	0.492	12.49	177	58	74	.....
	9.55	2171	1.625	1.046	5.88	156	57	72	.....
	27.73	2103	2.494	0.553	11.12	160	56	71	.....
Av	**22.33**	**2112**	**2.305**	**0.635**	**9.69**	**161**	**57**	**73**	**29.087**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank shaft speed rpm	% Slip of drive wheels	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
VARYING DRAWBAR POWER & FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—4th Gear											
35.36	2632	5.04	2008	5.55	3.270	0.568	10.81	167	62	68	29.150
75% of Pull at Maximum Power—Ten Hours—4th Gear											
28.30	1986	5.34	2108	4.61	2.828	0.614	10.01	161	53	54	28.995
50% of Pull at Maximum Power—Two Hours—4th Gear											
19.04	1312	5.44	2122	3.44	2.348	0.758	8.11	155	52	55	28.918
MAXIMUM POWER WITH BALLAST											
31.46	5149	2.29	2081	14.61	2nd Gear			161	54	58	28.960
34.94	3549	3.69	2002	7.61	3rd Gear			162	62	67	29.150
35.45	2652	5.01	1997	5.62	4th Gear			166	63	68	29.150
34.94	1870	7.01	2000	3.71	5th Gear			162	63	68	29.150
31.60	805	14.72	2000	1.85	6th Gear			160	54	58	28.860
MAXIMUM POWER WITHOUT BALLAST											
30.74	2343	4.92	2069	13.71	4th Gear			165	65	70	28.570

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—4th Gear

Pounds pull	2650	2750	2800	2800	2900	2900
Horsepower	35.5	33.0	29.1	25.4	23.2	19.3
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	421 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	211 lb each	None
Height of drawbar		22 inches	23½ inches
Static weight	—Rear	4675 lb	2074 lb
	—Front	1965 lb	1406 lb
Total weight with operator		6815 lb	3655 lb

Department of Agricultural Engineering

Dates of Test: May 11 to May 26, 1959

Manufacturer: THE OLIVER CORPORATION, CHARLES CITY, IOWA

Manufacturer's Power Rating: Not Rated

FUEL, OIL and TIME Fuel regular gasoline **Octane No** ASTM 83 **Research** 91 (rating taken from oil company's typical inspection data) **Specific gravity converted** to **60°/60°** 0.7423 **Weight per gallon** 6.147 lb **Oil** SAE 10W **API service classification** MS-DG **To motor** 0.989 gal **Drained from motor** 0.811 gal **Transmission and final-drive lubricant** SAE No 10W **Type** EP **Total time motor was operated** 46½ hours.

ENGINE Make Oliver **Type** 4 cylinder vertical **Serial No** 1082115 **Crankshaft mounted** lengthwise **Rated rpm** 2000 **Lubrication** pressure **Bore and stroke** 3⅝" x 3¾" **Compression ratio** 7.75 to 1 **Displacement** 155 cu in **Carburetor size** 1⅛" **Ignition system** battery **Cranking system** 12 volt battery **Air cleaner** oil washed wire mesh **Muffler** was used **Oil filter** replaceable pleated paper cartridge **Cooling medium temperature control** thermostat.

CHASSIS Type standard **Serial No** 73456-519 **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 30" 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 Right brake was adjusted during maximum power drawbar runs.

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 697.

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 pully 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 useage.

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.

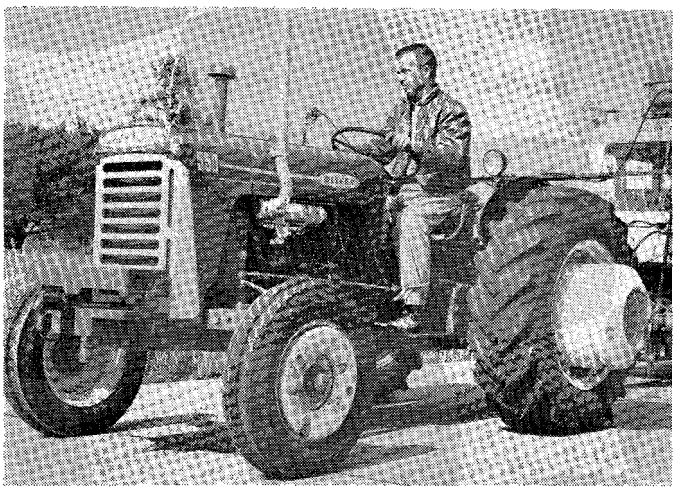
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine governor, automatic transmissions, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with 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 Gasoline Test 697