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## Test 696: Case Model 910-B (LPG)

Nebraska Tractor Test Lab

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

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# NEBRASKA TRACTOR TEST 696 – CASE 910-B LPG

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 Cooling medium	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury	
MAXIMUM POWER AND FUEL CONSUMPTION									
Rated Engine Speed—Two Hours									
71.05	1350	7.109	0.425	9.99	198	60	75	29.085	
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS									
63.78	1425	6.607	0.440	9.65	191	62	78	.....	
0.77	1503	2.096	11.571	0.37	181	59	75	.....	
33.00	1474	4.426	0.570	7.46	189	59	74	.....	
71.36	1351	7.186	0.428	9.93	198	59	75	.....	
16.87	1508	3.261	0.822	5.17	184	60	77	.....	
48.80	1453	5.534	0.482	8.82	192	59	75	.....	
Av	39.10	1452	4.852	0.527	8.06	189	60	76	29.168

## 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 Cool- ing med	Degrees F Air wet bulb	Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER & FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—3rd Gear											
62.14	5747	4.05	1360	4.46	7.062	0.483	8.80	194	67	70	28.780
75% of Pull at Maximum Power—Ten Hours—3rd Gear											
50.35	4370	4.32	1438	3.67	6.207	0.524	8.11	188	58	60	28.524
50% of Pull at Maximum Power—Two Hours—3rd Gear											
34.98	2908	4.51	1480	2.23	4.949	0.601	7.07	184	55	60	28.768
MAXIMUM POWER WITH BALLAST											
60.13	10499	2.15	1355	12.05	1st Gear	.....	186	47	53	29.115	
61.56	7258	3.18	1349	5.69	2nd Gear	.....	197	73	78	28.800	
62.07	5762	4.04	1354	4.32	3rd Gear	.....	195	68	72	28.780	
61.79	4633	5.00	1349	3.41	4th Gear	.....	198	73	78	28.800	
61.34	3739	6.15	1347	2.48	5th Gear	.....	195	73	78	28.800	
55.33	1698	12.22	1353	1.01	6th Gear	.....	193	74	79	28.800	
MAXIMUM POWER WITHOUT BALLAST											
61.20	5935	3.87	1356	8.57	3rd Gear	.....	195	48	58	29.000	
VARYING DRAWBAR PULL & TRAVEL SPEED WITH BALLAST—3rd Gear											
Pounds pull			5750	5850	5850	5950	6000	5900			
Horsepower			62.1	56.2	49.9	44.4	38.4	31.5			
Miles per hour			4.0	3.6	3.2	2.8	2.4	2.0			

## TIRES, BALLAST and WEIGHT

		With Ballast	Without Ballast
Rear tires	—No, size, ply & psi	Two 18-26; 8-14	Two 18-26; 8-12
Ballast	—Liquid	1560 lb each	None
	—Cast iron	1040 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-18; 6; 28	Two 7.50-18; 6; 28
	—Liquid	129 lb each	None
	—Cast iron	306 lb each	None
Height of drawbar		18 inches	18½ inches
Static weight	—Rear	11320 lb.	6120 lb
	—Front	3260 lb.	2390 lb
Total weight with operator		14755 lb	8685 lb

Department of Agricultural Engineering

Dates of Test: April 29 to May 15, 1959

Manufacturer: J. I. Case Company,  
Racine, Wisconsin

Manufacturer's Power Rating; Not rated

**FUEL, OIL and Time** Fuel Commercial Propane Specific gravity converted to 60°/60° 0.5103 Weight per gallon 4.25 lb. Oil SAE 10W API service classification MM,MS and DG To motor 2.942 gal Drained from motor 2.226 gal Transmission and final-drive lubricant SAE No 90 Type MP Total time motor was operated 49 hours.

**ENGINE** Make Case LPG Type 6 cylinder vertical Serial No. 8124550 Crankshaft mounted lengthwise Rated rpm 1350 Lubrication pressure Bore and stroke 4" x 5" Compression ratio 8.0 to 1 Displacement 377 cu in Carburetor size 1½" Ignition system magneto Cranking system 12 volts (2-6 volt batteries) Air Cleaner oil washed wire mesh Muffler was used Oil filter replaceable wood cellulose element Cooling medium temperature control thermostat.

**CHASSIS** Type standard Serial No. 8124550 Tread width rear 67½" front 54¾" Wheel base 84" 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 23¾" Vertical distance above roadway 33¼" Horizontal distance from center of rear wheel tread 0" to the right or left Hydraulic control system direct engine drive Advertised speeds mph first 2.5 second 3.4 third 4.3 fourth 5.2 fifth 6.4 sixth 12.5 reverse 2.9 Belt pulley diam 13½" face 8¼" rpm 944 Belt speed 3338 fpm Clutch over-center oil cushion operated by hand lever Brakes double disc operated by two foot pedals Power take-off 540 rpm at 1350 engine rpm Steering power assisted Turning radius (on concrete surface with brake applied) right 135½" left 135" (on concrete surface without brake) right 192½" left 194" Turning space diameter (on concrete surface with brake applied) right 282½" left 281½" (on concrete surface without brake) right 396" left 399".

**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.

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.



Case 910-B LPG Test 696